TWENTY-SEVENTH ANNUAL REPORT

OF THE

State Department of Health

OF

NEW YORK

FOR THE YEAR ENDING DECEMBER 31, 1906

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TWENTY-SEVENTH ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

STATE OF NEW YORK,

Executive Chamber,

Albany, *February* 4, 1907

To the Legislature:

I have the honor to transmit herewith the twenty-seventh annual report of the State Department of Health.

(Signed) CHARLES E. HUGHES

NEW YORK STATE DEPARTMENT OF HEALTH

Division of Administration

Commissioner

EUGENE H. PORTER, M.D.

Secretary and Deputy Commissioner

ALEC H. SEYMOUR

Division of Sanitary Engineering

Consulting Engineer ....THEODORE HORTON, C. E.
Assistant Sanitary Engineer.............H. N. OGDEN, C. E.
Assistant Sanitary Engineer..........H. B. CLEVELAND, C. E.

Division of Laboratory Work

State Hygienic Laboratory—Director.......H. D. PEASE, M.D.
Experiment Station at Saratoga, Director, D. C. MORIARTA, M.D.
Bender Laboratory—Director............R. M. PEARCE, M.D.
Cancer Laboratory—Director...........H. R. GAYLORD, M.D.

Division of Vital Statistics

Director..................................F. D. BEAGLE

Division of Communicable Diseases

Director...........................E. H. WOLCOTT, M.D.

Division of Publicity and Education

Director...............................HILLS COLE, M.D.

Consulting Ophthalmologist......HERBERT D. SCHENCK, M.D.
Consulting Dermatologist.............GEORGE H. FOX, M.D.

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REPORT

To Hon. CHARLES EVANS HUGHES, *Governor of the State of New York, Albany, N. Y.*:

SIR:—I have the honor to transmit herewith the twenty-seventh annual report of the State Department of Health for the year 1906.

In my report to Governor Higgins a year ago, I stated the conditions then existing in the Department, and outlined with a considerable degree of definiteness the work that it seemed to me ought to be accomplished during the coming twelve months. It may be deemed fitting, therefore, that this report shall begin with a brief recounting of things done in 1906, so that a comparison may be made with the things outlined in the report for 1905. Following this list of work actually done in 1906, there may be found a list of the "Things To Do In 1907." Then will come a discussion on "Appropriations;" then the "Recommendations" of the Department; and finally a concise statement of the work of each division of departmental effort.

I. The Things Done in 1906

REORGANIZATION:

In accordance with the statement made a year ago, the Department has been thoroughly reorganized, and consists at present of the following divisions:

The Division of Administration
The Division of Sanitary Engineering

The Division of Laboratory Work	State Hygienic Laboratory Antitoxin Laboratory Experiment Station Cancer Laboratory

The Division of Vital Statistics
The Division of Communicable Diseases

The Division of Publicity and Education { Bulletin / Circulars / Lectures / Sanitary Institute / Conference, etc.

This reorganization, carefully considered and planned, has enabled the Department to deal promptly and efficiently with matters submitted so far as the appropriations granted would permit.

THE STATE HYGIENIC LABORATORY:

For the first time in the history of the Department, it has its own laboratory. The bringing together under one roof of the chemical, bacteriological and antitoxin work, making possible coordination of effort, has increased the efficiency and power of the Department tenfold, and has already resulted in a great saving to the State.

Although the modest appropriation granted for this purpose was not available until October 1, 1906, the necessary building was finished, the various changes made, the apparatus and fittings secured and put in place with so little delay that we were ready to begin business on November 1, 1906. We are now able to undertake many important lines of investigation that before were impossible.

THE EXPERIMENT STATION:

The proper disposal of sewage, the solution of the problems attendant upon the treatment of manufacturing wastes, are among the questions arising in public sanitation that require direct and continued State aid. The Department has to deal with the problems arising from the disposal of all these wastes. It should, therefore, have afforded it the means for investigating the special difficulties.

Saratoga has furnished a suitable building, and this has been equipped and the work has been fairly begun. It is a most important step in advance and its importance can hardly be overestimated from a scientific standpoint.

THE SANITARY INSTITUTE:

This school for health officers and others interested in sanitation is the first of its kind in the United States, if not in the world. It is my purpose to hold the Institute in various parts of the State during the year, so that it may afford the majority of health officers convenient opportunity to attend the sessions. Meetings have been held at Albany and Binghamton, and one is soon to be held at Rochester. The subjects discussed at Binghamton were: "Water and Some of its Problems," "Sewage Disposal," "Demonstrations of Some Methods of Physical and Chemical Water Examination," "The Compulsory Vaccination Law," "The Diagnosis of Smallpox," "The Control of Smallpox," "Typhoid Fever from the Health Officer's Standpoint," and "Demonstrations of Some Laboratory Methods of Bacteriological Diagnosis." The Institute has proved a great success from the start and should be liberally supported.

REGISTRATION OF TUBERCULOSIS:

Decided progress has been made in the Division of Vital Statistics. At the beginning of 1907, the registration of all cases of tuberculosis was definitely required. There is no invasion of privacy and no interference with the rights of the attending physician.

If the "Great White Plague" is to be successfully controlled, this is one of the first steps to take. The International Classification of Causes of Death has also been adopted by the Department. By this system, it is made possible to compare large registration areas which heretofore has been practically impossible. Contagious diseases generally are now reported much more fully and opportunity given to keep close watch for possible epidemics.

SUMMER RESORTS:

During the past year information concerning 450 summer resorts and hotels has been obtained and is now on file. The conditions found in some places showed the wisdom of obtaining this information.

In one hotel on Lake George, the sewage from the hotel is being discharged into the lake but a short distance away from the intake,

which supplies the hotel with water. A hotel in the Thousand Islands was a short time ago taking its water supply from a bay in which there was little or no current and into which the sewage from hotels accommodating hundreds of people was daily discharged. A hotel on Long Island was found where the sewage from the hotel was discharged into a series of cesspools placed along the front of the building, directly under the windows of the rooms occupied by guests. The cesspools were but scantily covered and the ground was saturated with filth.

Every fall hundreds of people who visit the large number of summer resorts in the State of New York return to their city homes to be stricken down by typhoid fever.

This season, if funds are granted, summary action will be taken against those who refuse to comply with reasonable sanitary requirements.

SANITARY CENSUS OF THE STATE:

This census includes data gathered by the health officer of each municipality regarding the water supply, sewerage, sewage disposal, drainage, flood conditions, ground water conditions, street paving, garbage and refuse disposal, together with the proper indexing and filing and providing for keeping it up to date.

This information is of the greatest importance if acted upon; filed away and allowed to accumulate dust, it is worthless. It is only valuable when acted upon. Efficiency here, as elsewhere, depends upon the amount appropriated for the use of the Department.

SYSTEMATIC EXAMINATION OF RIVERS:

This examination includes the present pollution of these streams, their present suitability as sources of water supply, the wastes from factories and creameries, the refuse from pulp mills and many other important facts. Sanitary maps are being prepared of these watersheds on a large enough scale to show plainly each stream of appreciable size with the location of each source of water supply and all important sources of pollution. The map for the Oswego watershed is practically completed, and work on the Susquehanna watershed is two-thirds done. The upper Hud-

son has been pretty thoroughly examined, and work in the lower Hudson has been begun. Lack of funds has greatly retarded the work.

THE SANITARY CONFERENCE:

The annual conference held at Syracuse in October, 1906, was a most complete and gratifying success. The attendance was nearly double over that of the previous year and the interest manifested was very marked.

The conference was addressed by a number of distinguished scientists and sanitarians, including some prominent members of the Legislature. In connection with the conference was held a tuberculosis exhibition, kept open for the public for two weeks.

The educational influence of the conference was most marked, not only on the health officers who attended but on the people of the center of the State. It caused many sanitary reforms to be undertaken where before the conference it was impossible to get anything done.

DEPARTMENT PUBLICATIONS:

Perhaps no one thing has excited greater interest than the *Bulletin,* issued monthly, and the circulars and pamphlets sent out as required. The *Bulletin* has been enlarged and entirely changed in character, and new and up-to-date circulars of instruction have been issued, dealing with all infectious and contagious diseases. There are two sets of these circulars; one for the health officer, or attending physicians, and the other for the patients or family. That they are appreciated is indicated by the numerous requests for them not only in the United States but from abroad.

MEAT EXAMINATION:

The Department has just completed the examination of 154 cans of 138 kinds of meats and meat products. These meats have been examined microscopically, physiologically or chemically for the purpose of determining the extent to which such products are pure in quality or of varying nutritive value, and also to ascertain the extent to which preservatives were used.

A summary of the results of this investigation will be issued in circular form and be sent to every health officer in the State, to

every newspaper in the State, and to all boards of health in the country.

MEAT INSPECTION:

In June, 1906, I requested every health officer in the State to investigate the sanitary conditions of every meat market, slaughter-house and packing establishment and report to me upon the sanitary conditions of buildings, yards, etc.; the equipment, treatment of employees, and the methods of handling meats, and the inspection maintained of these places.

My request for this action was, in part, as follows:

> In view of the report recently made to Congress dealing with the existing conditions in certain slaughter and packing houses in the United States, the Department deems it essential that an immediate and thorough inspection be made by you of any and all meat packing establishments or slaughter-houses for animals, if any such are now maintained within your jurisdiction.
>
> Any such conditions as those outlined in the report above alluded to and commented on by President Roosevelt in his message to Congress accompanying the report are intolerable and must not be allowed to continue if they exist in this State.
>
> The evidence thus submitted warrants at least a speedy and painstaking inspection, and a prompt and full report of conditions actually found to exist.

The local health official responded at once and reports were received on hundreds of different places of this character.

Of the total number of reports received, ten contained but little definite information and were further investigated. One hundred and sixteen different municipalities of the State reported that no slaughter-houses existed within their jurisdictions, and detailed reports of over 400 other places were secured.

A comparatively small percentage of the meat markets were found in an unsanitary condition, but nearly one-half of the reports received on slaughter-houses and meat-packing establishments showed the sanitary conditions to be very bad. Some of them were described as being "filthy beyond description."

In a large number of these places the buildings are old, saturated with filth, seldom cleaned; the offal is fed to pigs kept on the grounds; swarms of flies have free access to the meat, and

the general unsanitary conditions are so bad that, had the local boards of health been thoroughly alive to their duties, they could not have been allowed to exist.

In all these cases, where reports of this character were received, the local authorities were instructed to order the premises put in proper sanitary condition immediately, and were also urged to see that some regular inspection was maintained in order to see that the necessary improvements were maintained.

THE CHILDREN'S SIGHT AND HEARING:

Twenty-one State medical societies, the American Medical Association, The American Public Health Association, State boards of health in twenty States and State boards of education of eight States have passed the following resolution:

Whereas, The value of perfect sight and hearing is not fully appreciated by educators and the neglect of the delicate organs of hearing and vision often leads to disease of these structures, be it therefore

Resolved, That it is the sense of the American Medical Association that measures be taken by boards of health, boards of education, school authorities and, where possible, legislation secured looking to the examination of the eyes and ears of all school children that disease in its incipiency may be discovered and corrected.

Three eastern States have passed laws requiring their State boards of health and education to see that the eyes of school children are systematically examined, and two of these also require an examination of the nose and throat. These three States are Connecticut, Vermont and Massachusetts. In a recent examination of 578 children with physical or mental defects, 419, or about 72 per cent., were found with defective eyes. In New York city, in a group of 1,857 children, 70 per cent. suffered from some form of nervous disease largely brought about and increased by defective eyes. It has been found in Philadelphia that only a little over 11 per cent. of the children have perfect eyes.

The necessity for an annual inspection of the eyes, at least of school children, is apparent. This is done now in some of the larger cities, in a few of the smaller ones, and not at all in the country districts, where its necessity is as great, if not greater, than in the cities.

The Department has taken this matter up with the educational authorities, has prepared a simple but effective plan of operation, and is ready to at once put its plan in execution if the funds are forthcoming.

SANITATION OF STATE INSTITUTIONS:

The preparation of plans for sewerage and sewage disposal for the institutions does not belong, under existing arrangements, to the Health Department. But, as the State Architect was unable to take up this work of a strictly engineering character, and as I felt that the State should set an example in its own institutions that should be above criticism so far as its sanitary arrangements were concerned, the task was undertaken. If a State institution were discharging raw sewage into a stream, it would very likely be found an arduous task to convince a town on the same stream that it ought to construct a sewage disposal plant.

Because of these reasons the Department has completed or has in preparation plans for sewer systems and sewage disposal plants for the following:

Albion — Western House of Refuge,
Kings Park State Hospital,
Newark Custodial Asylum,
Rome Custodial Asylum,
Rush Industrial Institution.

This service rendered by the Department was undertaken because of its pressing necessity. It has taken a great amount of time and drawn heavily on our slender resources. Only a small part of the work for State institutions has been done, but the Department is unable to do more without adequate appropriations.

SPECIAL WORK:

Besides the items just considered, the Department has had made twenty-three special investigations concerning outbreaks of communicable diseases; has watched carefully fifty towns where smallpox appeared at different times during the year, and taken necessary measures to aid the local authorities to prevent an epidemic; has made several investigations by direction of the Governor.

THE GENERAL WORK:

It may be of interest to note that, while in May, 1905, when the present Commissioner assumed office, the number of pieces of first-class mail received by the Department was 493, in January, 1907, the number of pieces of first-class mail has increased to 3,724. The daily average in May, 1905, was 16; in January, 1907, it was 143. The miscellaneous shipments from the Department, including everything, were 11,471; daily average, 441. In 1905 the annual reports of the Department for 1903 and 1904 were not even compiled for publication. In 1905 and 1906 the reports for 1903, 1904 and 1905 were all prepared and published. During 1906 the correspondence, which was back practically three years, was filed, indexed and brought up to date. The vital statistics returns for January, 1907, show that every board of health in the State is now making regular and prompt returns. In 1905 a number were back from six to nine months. The index work, which was anywhere from nine to fifteen months behind, has been brought up to date. That all this work has been so speedily performed is due to the loyalty and enthusiasm of the working force. They have worked faithfully, many of them after regular hours, and deserve commendation.

So much, then, for the work accomplished. The many different lines upon which this work has proceeded indicates clearly the many-sidedness of the Department and the varying character of the problems presented for solution. And I think it may be fairly claimed that the plan of work outlined in my report last year has been as faithfully carried out as the amount of the money given me would allow.

II. The Things To Do, 1907

The work of 1907 must in large measure be complementary to that of 1906. So many serious matters pressed for immediate action that I was unable in many cases to do more than preliminary work. So little money was available in comparison with the work demanding to be done that the appropriation had to be thinly smeared in order to make even a beginning. So that, along many lines, the work before us is a continuance of that already entered upon. A word may be said, however, in regard to some important lines of effort.

WATER POLLUTION AND SEWAGE DISPOSAL:

It is very probable that during the year of our Lord 1906 2,000 deaths have occurred from typhoid fever in the State of New York. As the estimated mortality from this disease is about 10 per cent., it needs no expert mathematician to figure out the distress, suffering and grief, the enormous loss — mental, physical and financial — that these thousands of cases of typhoid have cost us. And yet we know that it is almost entirely a preventable disease. We know it to be, in great part, a water-borne disease.

We know that we may, if we will, control nearly all the agencies that render the transmission possible of this disease, the most formidable enemy of the human race since the dawn of history. It would seem to be unnecessary to again exhibit the evidence showing that upon the continued pollution of streams depends in great measure the continued prevalence of typhoid. At Maidstone, in England, a few years ago, an epidemic of typhoid occurred; 1,908 cases were reported out of a population of 35,000. The outbreak was shown to have been dependent on the pollution of the water supply. Two hundred and fifty epidemics of typhoid have been collected and analyzed in Great Britain, and in every one the pollution of the water supply was the source of the evil. The recent epidemics at Plymouth, Butler, Ithaca, Pittsburg and Scranton, in our own country, only illustrate again that the continued pollution of our lakes, rivers and streams is a sin against the public health, a crime that strikes a deadly blow at the comfort and lives of our fellow-citizens.

The main pollution of our streams and lakes comes from the sewage of cities and towns; to this must be added the pollution of drains, cesspools, heaps of refuse, manufacturing wastes, etc. Besides this, public water supplies may be polluted by proximity to sewers, drains, cesspools, graveyards, carelessness of tramps or workingmen and the wash of severe rain storms.

Now, these conditions are inexcusable, shameful. They have existed for years; they ought not to exist another day.

How shall we proceed to push this reform — for it is a great sanitary reform — forward with the greatest possible speed?

I fully believe that our people would be with us heart and soul in endeavoring to clean up our beautiful lakes and rivers if

they only clearly understood the great and urgent necessity for it. I am convinced if they could be made to see just what a continuance in the policy of pollution means they would demand of us immediate and effectual action. Here, then, let us remember the word "Education." In every possible way our fellow-citizens should be told of the conditions that exist, the changes that are required, the results that will follow. With a strong and educated public sentiment behind us, the progress on the high road of sanitation will be much easier and faster.

But this campaign of education must be along rational and well-conceived lines. Half-baked enthusiasts, rendered dangerous by the possession of a little knowledge, should be gently but firmly led to the rear.

It must be clearly understood that the problems presented by the present pollution of our streams are not in any sense of the word simple ones. To select one town on a river and order it to construct a sewage disposal plant, regardless of conditions existing along that river, hinders rather than helps. To object to one sewer discharging when hundreds of others are pouring out their contents and are likely to indefinitely continue, may indicate interest, but demonstrates with painful clearness an absolute inability to grasp the situation.

Before any intelligent or coherent steps in this direction may be taken concerning the purification of any stream, the entire watershed to which it belongs must be thoroughly studied.

The sources of the water, character of soil, number of villages and towns, population of such, conditions of sewage, conditions of water supply, manufacturing establishments and their various wastes, maximum and minimum flow of the main river and its tributaries, all these things and many more must be learned before it can be intelligently decided whether the single town above referred to shall or shall not be required to put in a sewage disposal plant. In other words, this work of the purification of our streams must proceed along broad and comprehensive lines. Otherwise it will make no permanent and satisfactory progress. What should be done for the Oswego river will be determined after such an investigation as the one above described has been made and the full reports and sanitary maps submitted. Then, and not till

then, can it be decided just what is the proper and wisest thing to do.

It is most fitting also to remind some of our exuberant friends that sewage disposal plants were designed primarily to avoid nuisances, and not because it was thought that they alone would render a water potable and free from danger.

The effluent from a sewage disposal plant, while very greatly better than the raw sewage so far as infection is concerned, cannot yet be said to be free from danger. Filtration plants play a most important part in securing water fit to drink, and the fact should be remembered.

The most important work before the Department is the purification of the streams, which carries with it, of course, the disposal of sewage. The amount given heretofore to carry on this work has been so insufficient as to be ridiculous. It is not a small problem and cannot be undertaken in a small and niggardly way. The policy of the Department will be what it has always been since the present Commissioner was appointed. "*The continued pollution of our streams and lakes must stop. No town or municipality will be allowed to discharge raw sewage into any body of potable water without very cogent reasons.*" But the policy of the Department will be based on the broad principles outlined above.

The State Hygienic Laboratory must be strengthened and its facilities increased if the work put upon it by increased activities is to be properly done. With that goes, of course, the experiment station at Saratoga; the investigations undertaken there have just been begun and the work must be broadened out.

Besides these matters the Department intends to improve the sanitary institutes, strengthen and better the registration of vital statistics, perfect its equipment in case of epidemics, continue its examinations of oils, meats, patent medicines, etc. upon which it is now engaged, and many other matters that space forbids mention of.

The matter of garbage disposal for cities and villages is one of the most perplexing questions that the officials are called upon to solve. The Department proposes to inspect the plans for garbage disposal plants to be built in the State and assist where it can in arriving at more satisfactory conclusions on this subject.

III. Appropriatinos

After a careful study of the needs of the Department I have decided to ask the Legislature to allow me in the annual appropriation bill $92,700. This amount does not seem excessive when the work to be done is considered, and I have endeavored to ask only for such an amount as I believe would be advantageously used. It may be instructive to glance for a moment at the progress made by other States in health matters. Pennsylvania appropriates $350,000 in bulk, and the money is available in any way the commissioner sees fit. Ohio has a special appropriation of $15,000 for investigation of water and sewage disposal plants. Massachusetts appropriates $50,000 for water purification and sewage disposal. These three States have done splendid work and are years ahead of the State of New York in this important work. Other States have also done good work on sanitary lines and have made liberal appropriations. An index of the degree of legislative interest in public health may be found in the relative amount of money contributed by States for sanitary purposes. The most recent figures show that the greatest per capita expenditure for sanitary purposes was made by Florida, Vermont, Massachusetts, Rhode Island, Texas, Mississippi, Maine, New Hampshire, and Minnesota, in the order named. In each of these States the expenditures for the purpose named exceeded one cent per capita, and in the first three it exceeded two cents per capita. It will be noted that New York does not appear in the list. Does anyone think the people of this State are proud of this record, or that they would not be more than willing to provide liberally for sanitary work?

A somewhat prominent member of the Legislature said to me last year: "Doctor, when an epidemic occurs it is time enough to look after localities; then go and stamp it out." Is that really the time for the Health Department to intervene? After the stricken town has been quarantined, tabooed, its business ruined, when its graves are filling fast and the mourners go about the streets — then the Health Department is called upon for investigation and help. The sick desire to be cured. But the function of the Health Department is not to cure, but to prevent. Investigations after the calamity, to determine the cause, are much more

expensive and much less satisfactory than the investigation that precedes the possible catastrophe and prevents it altogether.

It may be of interest also to consider the fact that the last appropriation bill carried for "Diseases of Domestic Animals," $35,000, and "Diseases of Plants," $20,000 — $55,000; or only $2,000 less than the Department of Health had for all its work. So that there was appropriated for diseases of domestic animals alone several times the amount available for use in contagious diseases among the people of this State, and over two-thirds of the amount appropriated for the entire work of the Department. New York City gives its department of health $1,600,000; the Health Department of the great State of New York received the truly regal sum of $57,360. Some items in the supply bill increased this amount to $89,766.35. The law has imposed for years upon this Department the duty of regularly and extensively examining foods, illuminating oils, wines, beers and liquors, etc., and not a dollar has been appropriated to cover the services or defray the cost. It does not seem to me that further argument is needed to show that the Health Department of New York State should be given an adequate appropriation.

IV. Recommendations

The purposes of the Department under the existing law, while extensive, are not well defined. Many of the provisions of the Public Health Law have had no judicial determination. So vague and indefinite are some portions of the law that a reasonable hesitation might be felt in exercising the authority apparently granted. In other instances, there is an undoubted lack of authority which greatly hampers the work of the Department. Still, the Commissioner is invested with a wide discretion and with authority to accomplish very much for the good of the State. And I do not believe that any addition should be made to the existing Public Health Law unless supported by an adequate appropriation to render the provisions effective.

I will venture, however, to recommend certain changes in the law which seem to be urgently needed:

1. PURE FOOD LAW:

An adequate pure food law should be passed by the Legislature. The present law, as it stands, is under the control of the Agricultural Department and the Health Department, and should be repealed and a new law prepared, drawn along the lines of the Federal law.

In this way, the work of the Federal authorities in this State can be taken advantage of and supplemented by the State officials. Standards similar to those adopted by the Federal authorities can be put into effect, and regulations adopted along their lines. The result would be a uniformity of law affording better control of adulterated and misbranded foods, etc., and fairer to the manufacturer than any other system. Not only this, but the State would gain in being able to take advantage of the research work done by Federal authorities. It is, in my judgment, the most effectual and econcmical way to control the question of pure foods, in which this State should be a leader.

2. VITAL STATISTICS:

The present law exempts the cities of New York, Albany, Buffalo and Yonkers from the provisions requiring the original certificates of births, marriages and deaths to be filed at this office. As over one-half of all deaths and births occur in Greater New York, there is reason in exempting that city from the provisions of our law. But no good reason exists why the other cities mentioned should not file their certificates in Albany. The registration office of the State should have complete records. These cities can preserve a local registry and no apparent advantage comes to them from maintaining a separate filing place, and a distinct disadvantage results to all who have reason to expect that the State Department of Health has a full and complete record.

3. CAR SANITATION:

The question of proper car sanitation is one that is attracting attention among health authorities. The matter was discussed at the Fourth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine Hospital Service, held in Washington, D. C., last May and at which this Department was represented.

It is worthy of consideration by our legislators and should be thoroughly done and carefully enforced.

4. POLLUTION OF STREAMS:

Another matter of great importance is the question of *pollution of streams.*

The law at present gives the Commissioner of Health a certain power over the pollution of streams by providing that plans for sewer systems must be submitted to him. The law should go further than this, as it does in Pennsylvania, and give him the authority to order the sewage of a municipality taken out of the waters of the State where it is necessary; and such an act might well require that this be done only when it has been approved by the Governor.

The Commissioner of Health should have authority not only to order sewage taken out of the waters of the State but also to make orders for the protection of the water supplies of summer resorts, hotels, factories, etc., where he finds there is danger to the health of the citizens of the State.

5. STATE SUPERVISION OF WATER SUPPLIES:

A new law requiring that plans for public water systems must be approved by the State Commissioner of Health before being constructed. This law would not interfere with the authority of the present State Water Supply Commission, whose functions of approval are confined to the condemnation or acquisition of property.

The Public Health Law gives this Department power to "make rules and regulations for the protection from contamination of any or all public supplies of potable waters and their sources within the State." Many places have availed themselves of this authority and in each instance a careful inspection has been made and a set of rules formulated to meet the local conditions. Violations may be punished and are frequently investigated by the Department. After the adoption of these rules all sources of pollution can be removed and the water supply thoroughly protected by maintaining a proper inspector. This law, which has been on the statute books since 1885, was amended last year to

give the Commissioner of Health power to order special inspections of the watershed. The Department purposes to see that both regular and special investigations are made at frequent intervals. As any municipality may avail itself of such rules, it would appear that the State supervision of water supplies is at present where it belongs, under the control of the Health Department.

6. POLLUTION OF THE HUDSON AND NEW YORK BAY:

The great State of New York should have a Health Department able to lead the way in all matters of sanitation. To accomplish this, the Department must be strengthened by giving in its charge all matters that directly concern the public health. The creation of commissions to do work that some one of the divisions of the Department is fully competent to perform is to weaken the Department, lessen efficiency, increase expenditure and destroy all real responsibility. In case, however, questions arise of an intricate and perplexing character, involving grave and important interests and demanding a large amount of special and expert work, it might be most desirable to have a commission appointed to aid the Department in its work. Such a question is undoubtedly the pollution of the lower Hudson and New York bay. This concerns the health of millions of people, the expenditure eventually of great sums of money, and requires the utmost care that science can give for its solution. The Department is vitally interested in this work and should aid such a commission in every possible way. The commission, in turn, should be an extension of the Department and work in harmony with it. I would suggest that the question of the increasing pollution of the New York harbor is one that ought not to be much longer put aside. The entire matter should be taken up in a most comprehensive fashion, and the investigation once entered upon should not cease until practical conclusions were reached.

V. Statement of the Work of Each Division

DIVISION OF ADMINISTRATION

The business transacted during 1906 in every division of the Department has been far in excess of any previous year. All office work has been promptly and thoroughly done; the work of

each division has been supervised and inspected; plans laid for future efforts; and a systematic business organization effected.

DIVISION OF SANITARY ENGINEERING

Owing to increased interest and activity in matters relating to water supplies and sewage disposal throughout the State, as well as the enlargement in the scope of this division, there has been a marked increase of work turned out during the past year.

This work covers a large field of general and special engineering investigations and duties based primarily on the vital principle of protection of the purity of our public waters.

Among the more important of them may be mentioned:

(a) Preparation of rules and regulations for the protection of public water supplies and investigations of alleged violations, as prerequisites to legal prosecutions.

(b) Examination of plans for systems of sewerage and sewage disposal.

(c) Preparation of plans for sewerage and sewage disposal of State institutions.

(d) Investigations of alleged pollution of streams by individuals, corporations and municipalities with a view to abatement.

(e) Investigation of public nuisances due to garbage plants, rendering establishments and other noxious trades.

(f) Investigation of epidemics of typhoid fever and other water-borne diseases.

(g) Advice to municipalities, especially smaller towns and villages on questions pertaining to water supply and sewerage.

PROTECTION OF PUBLIC WATER SUPPLIES:

A list of the municipalities, for the protection of whose water supplies rules and regulations were prepared, or for the alleged violations of such rules special investigations were made, are as follows:

Auburn,	Middletown,	Syracuse, Skaneateles Lake,
Chester,	Peekskill,	Ticonderoga,
Dunkirk,	Penn Yan,	Utica,
Hudson,	Stony Point,	Walton,
Huntington,	Saranac Lake,	Westchester County.
Mechanicville,	Stamford Water Co.,	

Attention was called in the last annual report of the Commissioner of Health to the better equipment which should be afforded this division for this important work. At the present time it is only possible, with the engineering force available, to respond to special requests for these investigations; whereas, systematic examinations should be made by the Department in advance of any request in order that trouble may be averted and these communities protected in advance against possible outbreaks of disease.

SEWERAGE AND SEWAGE DISPOSAL:

Questions relating to sewerage and sewage disposal constitute a considerable portion of the work of this division and may be included under the following three important divisions:

(a) Examination of plans for sewerage and sewage disposal and the issuing of permits for the discharge of sewage into the waters of the State.

(b) The preparation of plans for sewerage and sewage disposal systems for the various State institutions.

(c) Other investigations relating to sewerage and sewage disposal which have a direct bearing upon the health and comfort of these communities.

In the work included under the first of these subdivisions, relating to the examination and approval of sewer plans and the issuing for permits for the discharge of sewage into the waters of the State, it is necessary to examine carefully the plans that are submitted to see that there are no defects or omissions, and that the design is consistent with modern practice in this branch of engineering. It is further necessary to examine carefully the locality and topography to determine whether the design is applicable to the conditions of topography. In addition to the field examination, it is also necessary to make such other studies as relate to flow, density of population and other matters bearing upon the propriety of issuing or restricting the permits for the disposal of the sewage collected by the sewerage system.

In work of this nature prepared by the division, the following municipalities have received attention:

Amsterdam,
Auburn,
Batavia,
Binghamton,
Bronx Valley Sewer System,
Bronxville,
Catskill,
Celoron,
Dolgeville,
Eastview,
Garden City,
Hawthorn,
Indian Lake,
Ithaca,
Lake Placid,
Lestershire,
Lockport,
Lyndonville,
Marcellus,
Matteawan,
Milford,
Mohawk,
Mount Kisco,
Mt. Pleasant,
Newark,
North Elba,
Norwich,
Owasco,
Piermont,
Raybrook,
Rome,
St. Johnsville,
Saratoga Springs,
Schenectady,
Scotia,
Silver Lake,
Swinburne Island,
Troy,
Tuckahoe,
Valhalla,
Waterford,
Wellsbridge,
West Seneca.

Under the second subdivision of the work, that of preparation of plans for sewerage and sewage disposal for State institutions, we have one of the most important branches of the work performed by this division. This work is new work which has been taken up in addition to the regular work of the division during the year and has required a considerable portion of the total time available by the engineering division.

The institutions for which plans have either been completed or are in preparation are as follows:

Albion, Western House of Refuge,
Kings Park State Hospital,
Newark Custodial Asylum,
Rome Custodial Asylum,
Rush Industrial Institution.

The preparation of these plans for State institutions has been and is still officially under the supervision of the State Architect, but, owing to the impracticability of the State Architect taking up this work of a strictly engineering nature, and to the further fact that the plans must ultimately be submitted to this Department for approval, it is quite clear that this work should be retained as a part of the regular work of this division. Since also the preparation of these plans constitute a direct saving to the State in services that would have to be paid for by special appropriations, there is no valid reason why additional funds should not be allowed this division to secure such engineering assistance as is necessary to properly carry out the work.

In regard to general investigations relating to sewerage and sewage disposal not included above, these include examinations and inspections of sewer outlets of municipalities and factories, examinations as to existing sewerage purification plants and other examinations of localities where plans for sewerage systems are in contemplation. The municipalities where investigations of this nature have been undertaken during the year are as follows:

Batavia,	Lake Placid,
Bemus Point,	Malone,
Brantingham Inn,	Mamaroneck,
Brownville,	Montour Falls,
Briarcliff Farm,	Northport,
Coeymans,	Olean,
Cohoes,	Philadelphia,
DeKalb Junction,	Port Chester,
Dunkirk,	Salamanca,
Falconer,	Schenectady,
Gouverneur,	South Glens Falls,
Harrison,	West Seneca.
Kingston,	

It is evident from the foregoing that in questions relating to sewerage and sewage disposal, as with questions relating to the protection of water supplies, there is considerable additional work of a systematic nature that should be done by the division, as, for instance, inspections of completed systems to determine whether

the construction has been in accordance with approved plans and regular inspections of all sewer outlets and sewage disposal plants to observe their efficiency of operation.

Again, pressing requests have been made of the division to take up in addition to the preparation of plans for the State institutions, the work of superintending the construction of these systems. It is evidently advisable, on the ground of economy and in order to keep the responsibility for the successful operation of these plants centralized, that the work of construction should be carried out under the direction of the engineers who prepare the plans. Such additional work, is, however, quite impracticable with the present limited organization of the division and could only be undertaken in case additional funds and engineering assistance are made available.

INVESTIGATIONS RELATING TO STREAM POLLUTION:

The work of the division in respect to examinations of streams is one that includes not only the special inspections of the sources of pollution of the various streams of the State, but also a general and systematic examination of the watersheds of the State for the purpose of permanent record and convenient reference in studies of problems relating to water supplies and sewage disposal.

One of the most important subdivisions of this branch of the work which should be taken up at once is the preparation of the State sanitary map, which should have plotted upon it statistics obtained from the systematic examinations of the watersheds of all streams within the State. In these field examinations not only should such information as relates to stream pollution alone, but such statistics as relate to water supplies, sewerage and sewage disposal, should also be gathered and properly recorded on this map. The map or set of maps might appropriately be prepared from the United States geological survey sheets and properly mounted into wall plans, and by means of suitable symbols, have transferred to it the important information and statistics secured from examinations in the field. It is unnecessary to state that such a map will be invaluable in dealing rapidly with the many questions pertaining to water supply and sewage disposal which constantly come before the Department.

INVESTIGATION OF PUBLIC NUISANCES:

Public nuisances are the cause of many complaints to the Department, and whereas many of them are of an important and serious nature, there are many that are of less importance, but which, nevertheless, require considerable time to properly investigate. Among the more important ones may be included nuisances arising from rendering establishments, garbage plants, and other offensive trades. There are others too numerous and unimportant to mention.

A list of the municipalities, where public nuisances of importance have been investigated during the year, is as follows:

Barren Island,
Buffalo,
Colonie,
Findley Lake,
Gates,
Greenburg,
Popolopen Lake,
Schenectady,
Thompson Ridge,
Watervliet,
Wheatfield,
White Plains.

Owing to the time-consuming nature of investigations of this class, it is evident that a special bureau of the division could well be made of this class of work, delegated, for instance, to one or more intelligent inspectors, whose time could be profitably and exclusively spent on this work. The time of the consulting and assistant engineers could thus be conserved for work of a more important nature.

ADVICE TO MUNICIPALITIES:

One of the principal duties which devolve upon a State Department of Health is that of the dissemination of expert advice in all cases pertaining to sanitation. Such advice, in questions pertaining to water supplies and sewerage, is greatly needed in many localities in the State, especially by the smaller villages and communities who, either through lack of knowledge and experience in sanitation or through lack of funds, do not know what course to pursue when they have to face problems affecting their general health.

It would, in fact, seem only natural that a Department, which

formulates stringent rules for the protection of water supplies and imposes conditions upon which sewage may be discharged into the waters of the State, should furnish an outline or suggestive means by which these requirements can be fulfilled with the least burden of expense, and with due consideration to the future growth and ultimate requirements of the community.

Advice of this general nature has been freely given in all cases where it has been asked for and in many other cases where it was apparent that a community was considering a course that was apparently inconsistent with its future interests.

THE DIVISION OF LABORATORY WORK

I. STATE HYGIENIC LABORATORY:

The appropriation made by the last Legislature for the establishment of a State hygienic laboratory to carry on bacteriological and chemical investigations, did not become available until October 1, 1906. For the larger portion of the year, therefore, the work of this character has been conducted as heretofore in the various medical laboratories located at Albany.

In anticipation of the new arrangement of this work, and for the purpose of providing quarters for its conduct, plans were drawn, with the assistance of the State Architect, for an addition to the building occupied by the Antitoxin Laboratory of the Department, with the work of which it was intended to combine the work of the new State laboratory.

A contract for the construction of this addition was entered into on August 2, 1906, and the work started at once. The building was nearly completed by October 1st, and parts of it were utilized even before that date.

EXAMINATION OF FOODS:

In advance of the commencement of the routine work of the Hygienic Laboratory, a special investigation of the canned meats found on sale in various parts of the State was instituted, and 154 samples of forty-four varieties of meats and meat products were examined microscopically, physiologically or chemically for the purpose of determining the extent to which such products were poor in quality, or of varying nutritive value, and also to ascer-

tain the extent to which preservatives were used in their preparation.

These products were manufactured by thirty-nine American and two German packing establishments. Fourteen were found to contain preservatives, and less than half of those examined could be classed as high-class food products.

The full report of the director of the laboratory showing the complete details, will be found in his annual report.

This work will be continued as far as the appropriation for the Hygienic Laboratory permits, and additional samples will be collected and examined. Particular attention will be paid to food products manufactured in this State and intended for home consumption, but those imported from other States will not be neglected.

The investigation of outbreaks of sickness, attributed to the eating of diseased or improperly prepared or adulterated foods, will also be conducted. Two such investigations are now under way.

WATER EXAMINATIONS:

Upon the completion of the addition to the Antitoxin Laboratory, laboratory departments for the chemical and bacteriological examination of samples of water sent in for sanitary analysis, and for the conduct of the bacteriological diagnosis of disease, were fitted up in a proper manner. An expert sanitary chemist and a thoroughly trained bacteriologist were added to the staff of the laboratory.

A comprehensive plan has been devised and entered into for the collection of data concerning the past and present condition of the water supplies of the State, and especially the results of previous sanitary analyses. This will thoroughly pave the way for the installation of a systematic sanitary examination of the water supplies of the State. The need for such a scientific study and comprehensive analysis of the waters of this State cannot be over-emphasized, and nothing but a lack of a sufficient appropriation for the work now prevents the establishment of such a service.

Practical work on the examination of the water supplies of certain localities where typhoid fever has been particularly prevalent during the past year has been undertaken. In addition, the sanitary chemist has made an investigation of the water supply of the State Custodial Asylum at Rome, and has instituted an investigation of the efficiency of the sewage disposal plant of the Craig Colony for Epileptics at Sonyea.

The routine bacteriological examination of samples of water from individual wells and other small sources of supply, and the routine bacteriological work, has been continued at the Bender Hygienic Laboratory as a part of the work of the State Hygienic Laboratory.

INVESTIGATION OF TYPHOID FEVER:

The director of the laboratory has devoted considerable time to the work of studying some of the epidemics of typhoid fever which have occurred this year throughout the State, the details of which will appear in his report.

This disease appears, from his study of the outbreaks which have occurred, to be due to a variety of causes, and the determination of the means of its transmission in each outbreak appears to be difficult of accomplishment by local officials on account of the lack of laboratory assistance in the determination of the causation of the outbreak, as well as in the diagnosis of the disease, and the designation of those well persons who act as carriers of the typhoid bacilli. The Royal Prussian Government has instituted a special commission, headed by Professor Koch, not only for the study of this disease, but for its scientific control.

In view of the continued presence of this most expensive and entirely preventable disease in this State, and for the purpose of ascertaining the conditions under which it exists and develops in different sections of the State, I would urge, therefore, that a special appropriation be made for the scientific investigation of this disease in order that small laboratories, working in harmony with the State Hygienic Laboratory, and according to one general plan, may be established in various sections of the State, so that the study of the disease may be undertaken near the site of its development.

THE EXAMINATION OF ILLUMINATING OILS:

Plans are now completed for undertaking the testing of illuminating oils, in accordance with the requirements of the Domestic Commerce Law, chapter 376 of the Laws of 1896, which impose upon this Department the burden of conducting tests of the safety of these materials.

II. ANTITOXIN LABORATORY:

The Antitoxin Laboratory has now completed its fifth year of the production and distribution of antitoxin, and has amply demonstrated the great value of its work to the people of the State. Thousands of children suffering with diphtheria have been saved from an untimely death, and in many more the disease has been entirely prevented by the use of antitoxin as a preventive agent.

During this period the laboratory has produced and distributed the equivalent of over seventy thousand (70,149) bottles of 1,500 units of diphtheria antitoxin, and the equivalent of over fifteen thousand (15,452) bottles of tetanus antitoxin. This antitoxin would have cost the citizens of the State, if purchased by them in the open market, at least $100,000 more than it has cost the State to maintain this laboratory.

Moreover, the State government has been saved, in addition, many thousands of dollars because of the quick availability of the State diphtheria antitoxin for the treatment and immunization of the inmates of State institutions. When the Antitoxin Laboratory was established, a serious epidemic of diphtheria had been going on in the Willard State Hospital for two years, and diphtheria was prevalent in the Utica State Hospital. Large supplies of diphtheria antitoxin were sent as soon as possible to these institutions, and the disease was soon under control, and has only appeared sporadically in these institutions since that time; and any tendency on its part to assume an epidemic character has been nipped in the bud by the wholesale administration of prophylactic doses of the remedy to the inmates.

Outbreaks, which gave every appearance of ultimately becoming most serious epidemics of diphtheria, have been aborted by the use of the State antitoxin in the State Reformatory at Elmira,

Craig Colony for Epileptics at Sonyea, Gowanda State Hospital, Binghamton State Hospital, and the State Industrial School, and practically every State supported institution has, at some time during the past five years, used the State antitoxin for the purpose of checking a more or less serious outbreak of diphtheria.

From the very outset of the distribution of antitoxins, the superintendents of State institutions have been urged to keep on hand sufficient supplies of diphtheria antitoxin, so that when a case of diphtheria suddenly appeared in their institutions the treatment of the patient, and the immunization of those who had been in contact with him, could be undertaken at once, and thus allow sufficient time to telegraph to the laboratory at Albany and obtain a large supply.

Aside from the actual monetary saving through State production and distribution of antitoxin, the time saved through the easy availability of the remedy at critical periods constitutes one of the most valuable features of the work. It is probably not too much to say that the cost of the maintenance of the laboratory for the last five years has been saved to the State because of the rapidity with which these frequent outbreaks of diphtheria in State institutions have been checked by the use of State antitoxin.

Private and other public charitable institutions, and municipalities, in all parts of the State, have shared these benefits with the State institutions, if, indeed, they have not been helped to an even greater extent. The delays necessary in many such institutions and governments, to obtain permission to spend considerable sums for materials of this kind would have, in most instances, allowed the outbreaks to gain considerable headway, and thus would have added very materially to the cost of their final control, to say nothing of the additional suffering and deaths.

The highest value of diphtheria antitoxin, both as curative and prophylactic agent, lies in its early administration, and the State production and distribution gives absolute availability of the remedy to the citizens of the State at all times. State antitoxins can now be obtained in practically every city, village or town of the State upon application to the local health officer.

The State production and distribution of tentanus antitoxin also accomplishes great good in that it provides the means for pre-

venting the distressing occurrence of lockjaw, especially that following Fourth of July injuries.

In probably no State in the Union is there such widespread use of tetanus antitoxin for the prevention of lockjaw in persons so injured as to be liable to its development, as in the State of New York. Hundreds of lives have been undoubtedly saved by its use during the last five years, and about 100 persons suffering the agonies of the disease have received all the possible benefits to be derived from its administration in unlimited amounts.

III. SEWAGE INVESTIGATIONS:

One of the most crying needs in public sanitation today is the proper disposal of sewage. These problems in each municipality present difficulties which require special study and investigation.

The larger cities can readily afford to undertake the special biological and chemical investigations necessary for a proper solution of their difficulties. The expense of these is prohibitive for the smaller communities, although their difficulties are usually not less, and are often greater than those of the larger cities. Moreover, the proper disposal of the sewage of these smaller communities is, in many instances, of the utmost importance to the large cities whose water supplies and good sanitary condition are frequently greatly endangered by the lack of such sanitary disposal of the sewage of these smaller municipalities.

These problems must be studied and worked out by the State, or they will remain either unsolved or improper remedies will be applied. As the law also requires this Department to take final action in the matter of the installation of sewage disposal systems by the municipalities of the State, it should, therefore, have the means for investigating and studying the special difficulties, and for utilizing the natural advantages presented in each local problem. Moreover, the efficiency of those disposal systems should be thoroughly tested upon their installation, and at frequent intervals thereafter.

The very meagre appropriation made by the last Legislature provided means for merely getting together a small experimental laboratory equipment, and the hiring of one laboratory worker. The village of Saratoga Springs granted the Department the use

of a building located on its sewage disposal plant, in which the work is being conducted. But very slow and unsatisfactory progress can be made under the present conditions. An appropriation sufficient to carry this work on in a satisfactory manner should be made.

IV. CANCER LABORATORY:

The work of the Cancer Laboratory at Buffalo has been continued the past year along lines I described in my report of a year ago. Much interest has been manifested during the past year in the work of the Laboratory, both at home and abroad, and the State can well afford to continue this important research work.

The report of the director is an interesting resumé of the work done and progress made. The serious problem the laboratory is attempting to solve requires and warrants continued liberal support, and its progress depends entirely upon the amount appropriated to prosecute it.

In order to enable it to maintain the leading position among cancer research institutions which belongs to it by right of seniority, the State should provide for a much needed extension of the volume and scope of the work.

DIVISION OF COMMUNICABLE DISEASES

During the past year this division has kept close watch over the sanitary condition of the State with especial reference to the more common communicable diseases: Measles, scarlet fever, smallpox, diphtheria, typhoid fever, cerebro-spinal meningitis and pulmonary tuberculosis. To collaborate with the permanent staff, sixteen physicians of special experience were appointed as medical experts. The residences of these medical experts are scattered throughout the State so that each can readily be called upon for special service in his neighborhood and he can report promptly on the investigation to which he is assigned. Among the valuable work done by these special assistants has been investigations of outbreaks of diphtheria at Gowanda State Hospital and Mill Brook; of malarial fever at Stony Point; of scarlet fever at Gowanda and Salem; of smallpox at Bath, Canandaigua, Catskill, Athens, Laurens, Livingston Manor, Monroe, Nyack, Wat-

kins and Mechanicville; and of typhoid fever at Castleton, Corinth, Fort Edward, Kerhonkson, Solvay, Wellsville, Whitehall, Pawling and Gouverneur.

In conjunction with the Division of Publicity and Education, an entirely new series of circulars of instructions dealing with communicable diseases, brought up to date and embodying the latest advances, has been issued to health officers. Circulars have also been issued for distribution in households in which there are cases of communicable diseases.

The cards, upon which reports of cases are made, have been much improved and there is a gratifying increase of care on the part of health officers in properly filling them out. Also, reports have been sent in much more promptly, and the number of reports received has corresponded more accurately to the number of cases in existence than in former years.

The work of the division has involved a large amount of correspondence in response to requests for instructions as to duties in and advice in handling specific instances.

A step in advance has been the requirement that all cases of measles shall be quarantined — cases in the country as well as in the cities. Experience has shown the necessity for and the wisdom of this regulation.

DIVISION OF VITAL STATISTICS

There are at present 1,415 local boards of health under the jurisdiction of the State Department of Health representing 932 towns, 442 incorporated villages and 41 cities. This is an increase of seven over last year.

TOTAL REGISTRATION IN THE STATE:

The complete registration of vital statistics in the State as reported during the year 1906 is shown by the following table:

Month.	Births.	Deaths.	Marriages.
January	16,197	12,799	7,804
February	13,754	11,435	6,160
March	14,322	12,254	5,058
April	13,836	11,931	5,944

Month.	Births.	Deaths.	Marriages.
May	15,377	12,955	6,302
June	13,588	9,814	9,803
July	17,338	12,727	6,913
August	14,982	11,887	6,664
September	15,309	11,229	7,517
October	17,853	12,134	8,924
November	14,767	10,333	8,944
December	15,709	11,275	7,837
Total	183,012	140,773	87,870

Estimating the population of the State to be 8,198,500, the above figures show the birth rate for the year 1906 to be 22.3 and the death rate 17.1 per 1,000 population.

The birth rate for 1905 was 21.3; and the death rate 17.

STILL BIRTHS:

During the year the number of still births reported to the Department was 9,401, which is a slight falling-off from last year.

DEATH RATE IN STATE INSTITUTIONS:

During the past year the death rate in the larger of the State institutions was 6.36 per 100 population, as against 5.56 in 1905 and 6.85 in 1904. The lowest death rate was in the Eastern New York Reformatory, where there were no deaths occurring out of 281 inmates; the highest was in Long Island State Hospital, which had 146 deaths out of 1,190 inmates.

CITIES SHOWING A DECREASE IN DEATH RATE:

As compared with last year, the following cities show a lower death rate for 1906: Albany, Cohoes, Corning, Elmira, Fulton, Hornell, Hudson, Jamestown, Johnstown, Kingston, Lockport, Middletown, New Rochelle, North Tonawanda, Oswego, Plattsburg, Rensselaer, Schenectady, Tonawanda, Troy, Watervliet.

CITIES SHOWING AN INCREASE IN DEATH RATE:

The following cities show an increased death rate: Amsterdam, Auburn, Buffalo, Cortland, Dunkirk, Geneva, Gloversville, Little

Falls, Mount Vernon, Newburgh, Ogdensburg, Olean, Poughkeepsie, Rome, Utica, Watertown and Yonkers; but several of these cities have a low death rate — Cortland, Gloversville, Little Falls and Olean below the average city death rate.

Rome, Ogdensburg and Troy are shown to have the highest death rate, and Jamestown and Tonawanda the lowest.

The average city death rate was 15.9 and the birth rate 19.7 per 1,000 population.

The birth and death rate of cities, grouped in order of population, is shown to be as follows:

Population.	Birth rate.	Death rate.
Cities of 100,000 to 400,000	17.3	16.3
Cities of 50,000 to 100,000	20.7	17.5
Cities of 20,000 to 50,000	19.9	16.2
Cities of 10,000 to 20,000	20.0	15.9

CITY REGISTRATION OF BIRTHS:

In last year's report the apparent incomplete registration of births was pointed out, as shown by the number of cities reporting a less number of births than deaths.

While there are several cities which show an increased registration over last year, the following cities have reported more deaths than births: Albany, Cohoes, Hudson, Middletown, Newburgh, Rensselaer, Troy, Watertown and Watervliet.

Dunkirk, Greater New York and North Tonawanda show the largest birth rate, and Albany and Troy the smallest.

TRANSCRIPTS:

Requests for certified copies of certificates on file in this Department, to be used for judicial and administrative purposes, were received as follows: Births, 195; marriages, 118; deaths, 253; total, 566.

CONDITION OF WORK IN THE DIVISION:

The condition of the work in the Division of Vital Statistics at the close of the year was much more satisfactory than at the close of 1905.

If the work of the division is to be kept up, it is essential that some provisions be made to provide additional clerical help, as the recent reorganization of the Division of Communicable Diseases now requires the services of clerks who had been able to devote their time to index work in the Division of Vital Statistics.

That the Commissioner of Health may have the necessary information on hand in order to properly "*investigate the source of mortality, and the effect of localities, employment and other conditions upon the public health,*" as required by the provisions of section 4 of the Public Health Law, it is highly important that the original death certificates, or true copies thereof, be on file in the State Department of Health.

In compiling the statistics of the State, to carry out the above provisions of the Public Health Law, it is necessary to know the sex and age of deceased, nativity, employment, duration of disease, cause of death, contributing cause, sanitary surroundings, etc.; and, that this work may be done with certainty, accuracy and uniformity, the individual certificates giving full information should be filed with the Department from the cities of Albany, Buffalo and Yonkers, thus giving the Department complete statistics outside of the city of Greater New York.

DIVISION OF PUBLICITY AND EDUCATION

PUBLICATIONS:

The *Monthly Bulletin* has been issued regularly during the year, and as early in each month as the receipt of the death certificates for the preceding month would allow. The scope of the *Bulletin* has been enlarged during the year so that it contains, not only the statistical tables that formerly composed its entirety, but from six to twelve pages of reading matter consisting of brief reports of the work done by the Department and short instructive articles dealing with matters of interest to health officers and others. It is intended that the *Monthly Bulletin* shall be the ordinary medium of communication between the Department and the health officers and health boards of the State. It is gratifying to learn that the enlarged *Bulletin* is being more and more read and appreciated by those for whom it is published, and

medical editors have quoted freely from it in their respective publications.

In co-operation with the Division of Communicable Diseases, a series of circulars, adapted for household distribution, has been issued, dealing with the following communicable diseases: Measles, scarlet fever, smallpox, diphtheria, typhoid fever, consumption, cerebro-spinal meningitis. Each circular describes, in language as little technical as possible, the salient features of the disease and its mode of transmission, and gives a series of rules for such care of the case as is necessary for the prevention of the disease. Health officers have been asked to see that a copy of the respective circular or information and rules equally distinct and specific is put into the hands of the head of a household visited by one of the above diseases. A circular has also been issued dealing with disinfectants and disinfection. It is felt that these circulars will advance the public health, not only by the more intelligent and exact care of individual cases, but also by the spread of knowledge concerning the chief communicable diseases.

Suggestions to health officers as to the regulation of cases of the above diseases have also been issued in circular form to all the health officers.

The division has recently issued, in conjunction with the Division of Administration, a revised edition of the "Health Manual," containing the laws and sections of laws of the State of New York relating to public health, instructions to health officers, and suggestions to boards of health in the framing of public ordinances.

The proceedings of the sixth annual conference of sanitary officers of the State of New York were printed in full and issued to health officers and others.

RECORD AND CLASSIFICATION OF COMMUNICABLE DISEASES:

In conjunction with the Division of Communicable Diseases, a new series of cards upon which health officers are to record the facts ascertained in cases of the chief communicable diseases, has been drawn up and issued. Health officers have been asked to be more prompt in the use of these new cards and arrangements have been made to follow up those who fail to comply with this request.

Therefore, as a special feature of the State Sanitary Institute, the Department urgently needs to establish a traveling tuberculosis exhibition which can be loaned to the various cities, villages and other municipalities in the State for the demonstration of modern methods of preventing and hygienically treating pulmonary tuberculosis.

The exhibition should consist of a statistical exhibit, made up of charts, tables of statistics concerning tuberculosis, and photographs and illustrations of institutions, and methods of preventing and treating consumption. It should also have an exhibit of apparatus, clothing, chairs, tables, eating utensils, sputum cups and other articles required by modern methods. The exhibition should also contain an exhibit of pathological and bacteriological specimens, demonstrating the condition found in this disease.

In connection with the holding of exhibitions in various parts of the State, there should be given lecture courses fully illustrated with lantern slides, and the Department should have at its disposal a complete set of slides, showing all phases of modern work upon this disease.

.Such an exhibition would require an intelligent manager who should devote his entire time to the work of the Sanitary Institute.

THE SANITARY CONDITION OF THE STATE

Epidemic diseases, including under this head typhoid fever, diphtheria and croup, erysipelas, malarial diseases, smallpox, measles, scarlet fever, whooping-cough and cerebro-spinal meningitis, caused 8,915 deaths during 1906. This is about 6 per cent. of the total mortality of the State and represents about 1.09 per thousand of population. In 1905 there were 592 more deaths attributable to this same group of diseases with which the State Department of Health is most chiefly concerned, and epidemic diseases then accounted for 6.9 of the total mortality and represented a death rate of 1.18 per thousand population.

Unfortunately, this does not indicate a general diminution in the fatality of epidemic diseases since the high mortality in 1905 was due very largely to the epidemic of cerebro-spinal meningitis then prevalent. The deaths from this disease in 1906 were nearly

1,400 less than they numbered the previous year. The figures for 1906, 1,178 deaths, compare favorably with those of 1904, when the mortality from cerebro-spinal meningitis was 1,708. The average mortality from the same cause during the five years 1899–1903 was 527.

Typhoid fever caused 1,568 deaths in 1906, or 19.1 to each 100,000 population. In 1905 there were 192 deaths from this cause to each 100,000 population. There has been no extensive epidemic in this State during 1906. Some of the outbreaks that have occurred have been investigated by the Department's sanitary engineers and medical experts. While polluted water remains the chief carrier of infection, a good many cases have been traced to infected milk, contact infection and transmission by flies.

Measles has been quite prevalent during the past year and has reached its highest mortality since 1896. There were in all 1,369 deaths from this disease, 381 more than in 1905. More than 80 per cent. of these deaths occurred in the first six months of the year, and it would appear that the crest of the wave of prevalence has been reached and passed.

Diphtheria caused 2,691 deaths in 1906, an increase of 395 over the total for the preceding year, which showed the smallest annual mortality on record in this State. The mortality this year is well below the average for the preceding five years In the first three months of the year there was a high mortality in New York city from diphtheria, 77.4 per cent. of the total deaths from diphtheria being recorded during this period occurring in the metropolis. In September and October New York city's proportion of the deaths recorded from diphtheria fell to 53.2 per cent. and 54.3 per cent. respectively. During the last three months of the year diphtheria has been unusually prevalent outside of New York city.

A mild form of smallpox has been epidemic in parts of the State. Only seven deaths have been reported from this disease, two less than in the previous year. The following list of counties, with the list of cases reported from each, will show that the disease has not been confined to one section: Albany, 22; Cattaraugus, 1; Chautauqua, 4; Columbia, 2; Delaware, 1; Dutchess,

1; Erie, 4; Genesee, 4; Greene, 200; Herkimer, 1; Montgomery, 15; Greater New York, 96; Niagara, 2; Oneida, 1; Ontario, 15; Onondaga, 1; Orange, 12; Otsego, 8; Rensselaer, 9; Rockland, 12; Saratoga, 11; Schuyler, 8; Steuben, 36. It will be seen that the majority of the cases occurred in the Hudson valley district.

Scarlet fever is now on its second year of low mortality. The deaths per 100,000 population during 1906 were 8.7, a lower figure than was reached at any time during the preceding ten years.

Deaths from cancer remain as they were last year, 75 per 100,000 population (6,167). Hitherto there has been a slight increase every year.

From consumption there were 14,027 deaths, which was 30 per 100,000 less than in 1905. The reduction is in accordance with the fact that the mortality from tuberculosis in all civilized countries, except Norway and Ireland, is being lessened perceptibly, we cannot yet say "markedly." It may be that the situation is really better than the figures show, since improvements in registration tend to increase the number of cases recorded.

Pneumonia once again shows a higher mortality than any other disease. There were 15,332 deaths from this cause, an increase of 1,175 over the figures of the preceding year, and of 1,808 over those for 1904. The highest mortality from this disease occurred in March, and caused this month to show the highest total mortality for the whole year. Pneumonia was responsible for 187 deaths per 100,000 population.

The second highest monthly total mortality occurred in August, and was due to a total of 2,339 deaths under 2 years of age from diarrhea and enteritis. There were more deaths from this cause in this month than from any other disease in any other month. This slaughter of the innocents demands a campaign of education among the purveyors of milk, possible State registration and regulation of dairies and creameries, and the education of the people in the feeding of infants.

The total mortality of the State for 1906 was 140,773, which, based upon an estimated population of 8,198,500, gives a death

rate of 17.1 per thousand population. The average death rate for the ten years 1896–1905 was 17.7 per thousand population.

I submit that the Department has gone as far on the course outlined last year as it could with the means at its disposal.

We will accomplish as much in 1907 as its funds will permit. A firm basis has been established for a much further development.

The Health Department of New York State should be the best in this country.

Respectfully submitted,

EUGENE H. PORTER,

Commissioner of Health

February 4, 1907.

APPENDIX

TWENTY-SEVENTH ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

DISBURSEMENTS FOR THE FISCAL YEAR, ENDING SEPTEMBER 30, 1906

Present employees:

		Salaries	
Eugene H. Porter, M.D., Commissioner:			
Salary	$3,500 CO		
Expenses	1,000 00		
		$4,500 00	
Alec H. Seymour, secretary		2,500 00	
Fenimore D. Beagle, chief clerk and registrar		2,208 63	
Frederick C. Curtis, M. D., medical expert		1,000 00	
Edwin H. Wolcott, M. D., medical expert on contagious diseases		500 00	
Frank J. Sanborn, stenographer		572 60	
Charles E. Thompson, clerk		1,500 00	
A. K. Cole, clerk		1,500 00	
William A. Wallace, clerk		1,500 00	
Jeremiah Grogan, Jr., clerk		773 70	
Cora B. Partridge, clerk		700 00	
Elizabeth E. Staley, clerk		495 16	
Edward C. Kenny, stenographer		210 00	
John G. Hines, messenger		431 13	
Ella H. Porter, clerk		495 16	
Meta E. Mills, junior clerk		436 00	
			$19,322 38

Late and temporary employees:

T. A. Stuart, chief clerk	$122 58	
Anna L. Mattimore, stenographer	647 42	
Adelaide R. Van Arnum, clerk	200 00	

	Salaries	
Anna B. Byrne, clerk	$200 00	
Bessie Chichester, clerk	50 00	
		$1,220 00
		$20,542 38

Antitoxin Laboratory

	Salaries
Herbert D. Pease, M. D., director	$3,000 00
Ida H. Lindsay, clerk	1,200 00
Marie A. Dowling, assistant bacteriologist	720 00
Charles L. Whitbeck, assistant bacteriologist	291 62
Grace McCullom, stenographer	410 00
Charles Schadler, stableman	600 00
*Peter Jones, assistant stableman	280 00
Walter Reynolds, assistant stableman	140 00
*John J. Ryan, cleaner	41 66
Blanche C. Vose, cleaner	385 00
Mrs. J. Cruickshank, cleaner	410 00
*Alfred Coley, cleaner	210 00
	$7,688 28

Disbursements

Oct.,	1905.	Salaries	$638 32	
		Sundries	929 70	
				$1,568 02
Nov.,	1905.	Salaries	$666 66	
		Sundries	321 45	
				988 11
Dec.,	1905.	Salaries	$671 66	
		Sundries	957 83	
				1,629 49
Jan.,	1906.	Salaries	$671 66	
		Sundries	697 45	
				1,369 11

* Late employees.

Feb.,	1906.	Salaries	$671 66	
		Sundries	435 41	
				$1,107 07
March,	1906.	Salaries	$671 66	
		Sundries	379 99	
				1,051 65
April,	1906.	Salaries	$671 66	
		Sundries	486 49	
				1,158 15
May,	1906.	Salaries	$600 00	
		Sundries	317 88	
				917 88
June,	1906.	Salaries	$600 00	
		Sundries	376 79	
				976 79
July,	1906.	Salaries	$615 00	
		Sundries	241 60	
				856 60
Aug.,	1906.	Salaries	$605 00	
		Sundries	189 80	
				794 80
Sept.,	1906.	Salaries	$605 00	
		Sundries	398 87	
				1,003 87
				$13,421 54
Disbursements from insurance received from loss by fire				1,972 76
				$15,394 30

Cancer Laboratory

	Salaries
H. R. Gaylord, M. D., director................	$2,499 96
G. H. A. Clowes, M. D., chemist..............	2,533 28
H. O. Luderer, assistant chemist..............	240 00
Gary N. Calkins, biologist..................	1,200 00
F. W. Baeslack, assistant biologist............	1,193 44

	Salaries
C. A. Maclay, secretary	$900 00
D. Averill, photo chemist	795 00
*Marie Onuff, assistant in microscopy	300 00
F. A. Payne, janitor	360 00
E. Kempkes, laborer	265 00
M. Weber, laborer	348 00
Elmer Menig, laborer	112 50
†Julius Huse, laborer	48 00
†Eliza Heppert, laborer	80 00
Alfred M. Kirsch, laborer	70 50
†Charles H. Nebb, laborer	25 00
*Ernest Becker, laborer	25 00
Clarence Witt, laborer	15 00
	$11,010 68

Disbursements

Oct.,	1905.	Salaries	$854 43	
		Sundries	1,202 86	
				$2,057 29
Nov.,	1905.	Salaries	$980 99	
		Sundries	910 40	
				1,891 39
Dec.,	1905.	Salaries	$860 99	
		Sundries	688 70	
				1,549 69
Jan.,	1906.	Salaries	$860 99	
		Sundries	589 25	
				1,450 24
Feb.,	1906.	Salaries	$848 16	
		Sundries	396 90	
				1,245 06
March,	1906.	Salaries	$855 66	
		Sundries	186 29	
				1,041 95

* Temporary employees. † Late employees.

April,	1906.	Salaries	$1,035 66	
		Sundries	645 90	
				$1,681 56
May,	1906.	Salaries	$935 66	
		Sundries	280 12	
				1,215 78
June,	1906.	Salaries	$953 66	
		Sundries	851 35	
				1,805 01
July,	1906.	Salaries	$958 16	
		Sundries	446 58	
				1,404 74
Aug.,	1906.	Salaries	$868 16	
		Sundries	564 37	
				1,432 53
Sept.,	1906.	Salaries	$998 16	
				998 16
				$17,773 40

Office Expenses

Supplies furnished local boards of health, furniture, books, printing and other office expenses:

October, 1905	$507 17
November, 1905	239 19
December, 1905	638 78
January, 1906	259 08
February, 1906	2,241 39
March, 1906	1,105 49
April, 1906	505 72
May, 1906	553 01
June, 1906	875 07
July, 1906	184 77
August, 1906	46 38
September, 1906	12 03
	$7,168 08

Disbursements

Printing, office stationery and supplies furnished local boards of health	$3,205 31
Furniture	553 65
Books	362 94
Telephone service	418 51
Telegraph and messenger service	161 34
Steel filing cases for correspondence	120 00
Other office supplies	2,346 33
	$7,168 08
Postage and expressage	$2,297 47

Traveling expenses

Expenses incurred by subordinates in making investigations, etc.:

October, 1905	$63 59
December, 1905	33 06
January, 1906	24 38
February, 1906	620 56
March, 1906	79 00
April, 1906	124 37
May, 1906	124 52
June, 1906	489 02
July, 1906	198 55
August, 1906	815 03
September, 1906	403 97
	$2,976 05

Bureau of Pathology and Bacteriology

Paid the Bender Laboratory for bacteriological work	$3,400 00
Postage and supplies	604 51
	$4,004 51

Bureau of Chemistry

Paid Prof. W. G. Tucker for analyses of water, etc.	$980 00
Supplies	1,089 76
	$2,069 76

Consulting Engineers

Paid Prof. Landreth, consulting engineer	$5,058 00
Paid Theodore Horton, consulting engineer	500 00
Paid H. B. Cleveland, assistant sanitary engineer	450 00
Paid Henry N. Ogden, assistant sanitary engineer	160 00
	$6,168 00

Steel filing cases	$1,125 00

Investigations

Annual Conference of Sanitary Officers	$787 65
Olin H. Landreth, consulting engineer	1,866 50
H. B. Cleveland, inspecting engineer	330 00
Eric T. King, inspecting engineer	167 50
Holmes C. Jackson, chemist	525 00
Leonard M. Wachter, chemist	150 00
Dr. F. C. Curtis, medical expert	205 00
Dr. Hills Cole, medical expert	100 00
Dr. J. T. Wheeler, medical expert	180 00
Dr. L. B. Couch, medical expert	75 00
Dr. Wallace Clark, medical expert	71 00
Dr. Baxter T. Smelzer, medical expert	67 03

Dr. E. H. Hutton, medical expert	$31 50
Dr. O. W. Peck, medical expert	20 00
Dr. D. M. Hibbard, medical expert	10 00
Dr. J. H. Meehan, sanitary agent	55 00
C. H. Brewer, sanitary agent	117 75
Relief of indigent Indians	22 50
Printing	264 91
Services of stenographers, traveling expenses, etc.	550 26
	$5,596 60

DIVISION OF VITAL STATISTICS

DIVISION OF VITAL STATISTICS

Eugene H. Porter, M.D., *State Commissioner of Health, Albany, N. Y.:*

Sir:—I have the honor to transmit herewith report covering the work in the Division of Vital Statistics for the year 1906.

There are at present 1,415 local boards of health under the jurisdiction of the State Department of Health, representing 932 towns, 442 incorporated villages and 41 cities. This is an increase of seven over last year.

The Department has kept the local boards of health well supplied with registration blanks during the year, and carefully checked up the monthly reports when received, and where there was an apparent discrepancy shown in the proper registration of vital statistics, the Department has taken up the matter at once with the local boards, and by so doing has brought about a more complete registration of births and marriages during the past year than has occurred during previous years.

Total Registration in the State

The complete registration of vital statistics in the State as reported during the year 1906 is shown by the following table, together with the average number of births, deaths and marriages recorded during the past five years in corresponding months:

MONTH.	1906 Births.	Average for past 5 years.	1906 Deaths.	Average for past 5 years.	1906 Marriages.	Average for past 5 years.
January	16,197	12,738	12,799	11,755	7,804	6,054
February	13,734	11,992	11,435	11,465	6,160	4,934
March	14,322	13,679	12,254	12,906	5,058	4,765
April	13,836	12,193	11,931	11,852	5,944	5,494
May	15,377	12,519	12,955	11,353	6,302	4,893
June	13,588	12,433	9,814	9,820	9,803	7,778
July	17,338	13,658	12,727	12,104	6,913	5,658
August	14,982	13,727	11,887	11,070	6,664	5,089
September	15,309	13,241	11,229	10,018	7,517	6,395
October	17,853	14,043	12,134	9,871	8,924	7,042
November	14,767	13,113	10,333	9,988	8,944	7,040
December	15,709	12,963	11,275	10,581	7,837	6,558
Total	183,012	156,299	140,773	132,783	87,870	71,700

Estimating the population of the State to be 8,198,500, the above figures show the birth rate for the year 1906 to be 22.3 and the death rate 17.1 per 1,000 population.

The birth rate for 1905 was 21.3, and death rate 17.

The following table gives the total number of births, deaths and marriages reported in the State during the past ten years; also annual rate per 1,000 population:

YEAR.	Births.	Deaths.	Marriages.	Representing Rate per 1,000 Population.		
				Birth rate.	Death rate.	Marriage rate.
1897	123,565	117,078	49,874	18.8	18.0	7.6
1898	140,887	120,972	57,108	21.6	18.5	8.7
1899	135,864	121,821	59,612	19.1	17.1	8.4
1900	142,828	128,468	63,103	19.6	17.7	8.7
1901	139,491	129,257	64,797	19.1	17.8	8.9
1902	146,740	123,494	68,903	19.7	16.5	9.2
1903	158,343	126,536	73,011	20.8	16.6	9.1
1904	165,014	141,304	74,677	21.3	18.3	9.6
1905	172,259	137,059	78,261	21.3	17.0	9.7
1906	183,012	140,773	87,870	22.3	17.1	10.7

Still Births

During the year the number of still births reported to the Department was 9,401, which is a slight falling-off from last year.

Death Rate in State Institutions

The following table shows the death rate in the larger of the State institutions:

INSTITUTION.	Inmates.	Deaths.	Rate per 100 Population.	
			1906.	1905.
Auburn State Prison	1,145	6	.52	1.11
Binghamton State Hospital	1,546	120	7.86	7.24
*Bloomingdale Asylum	327	19	5.81	5.28
Buffalo State Hospital	1,691	133	7.86	5.57
Clinton Prison	1,049	4	.38	.78
Craig Colony	1,244	58	4.66	5.47
Dannemora State Hospital	271	11	4.06	2.06
Eastern N. Y. Reformatory, Napanoch	281	0	.00	.52
Elmira Reformatory	1,453	8	.55	.77
Gowanda State Hospital	814	37	4.54	4.78
Hudson River State Hospital	2,264	207	9.14	8.38
Kings Park State Hospital	2,614	142	5.43	7.08
Long Island State Hospital	1,190	146	12.26	6.45
Manhattan State Hospital	4,369	370	8.46	6.21
Central Islip State Hospital	3,658	322	8.8	5.76
Matteawan State Hospital	667	12	1.8	2.71
Middletown State Hospital	1,294	64	4.94	5.19
New York Soldiers' Home, Bath	3,335	182	5.46	5.93
Rochester State Hospital	1,242	120	9.66	5.91
Rome Custodial Asylum	799	34	4.25	†
St. Lawrence State Hospital	1,801	156	8.66	6.01
Sing Sing Prison	1,279	4	.31	.71
State Prison for Women, Auburn	85	3	3.52	3.33
Utica State Hospital	1,180	108	9.15	7.63
Willard State Hospital	2,274	146	6.42	6.03

*Private. †Included with city of Rome in 1905.

The average rate of death of inmates of institutions is shown to have been 6.36. In 1905 it was 5.56.

City Registration

The following table shows the registration of births, deaths and marriages as reported from the cities in the State, and the birth and death rate for the year, as is also shown the average rate for the previous five years:

CITY.	Population.	Births.	Deaths.	Marriages.	Rate per 1,000 Population. 1906. Birth.	1906. Death.	Average for past five years. Birth.	Average for past five years. Death.
Albany	100,000	986	*1,766	610	9.86	17.6	12.5	18.0
Amsterdam	23,943	561	422	217	23.4	17.6	17.6	16.6
Auburn	31,422	638	543	360	20.3	17.3	17.0	14.8
Binghamton	42,036	715	678	1,150	17.0	16.1	13.9	16.1
Buffalo	376,587	8,075	†6,138	4,118	21.4	16.3	20.2	15.0
Cohoes	24,183	406	466	525	16.8	19.3	18.8	19.5
Corning	13,515	285	195	204	21.1	15.1	15.4	15.8
Cortland	11,272	165	150	107	14.6	13.3	15.0	14.7
Dunkirk	15,250	577	246	232	37.8	16.1	33.3	17.0
Elmira	34,687	536	513	677	15.5	14.8	14.4	14.9
Fulton	8,848	205	141	71	23.2	15.9	16.1	15.4
Geneva	12,250	214	203	129	17.5	16.6	19.4	16.2
Gloversville	18,672	327	276	210	17.5	14.8	15.2	14.0
Hornell	13,259	277	189	175	20.9	14.3	17.8	15.1
Hudson	10,290	201	202	83	19.5	19.6	16.8	19.9
Ithaca	14,615	219	207	166	15.0	14.2	14.8	16.5
Jamestown	26,160	511	276	790	19.5	10.6	19.7	12.7
Johnstown	9,845	167	120	77	16.9	12.2	16.7	13.4
Kingston	25,557	677	473	272	26.4	18.5	20.0	17.4
Little Falls	11,122	204	150	94	18.3	13.5	14.8	11.4
Lockport	17,552	339	243	156	19.3	13.8	20.2	16.1
Middletown	14,516	236	240	175	16.3	16.5	13.5	17.0
Mount Vernon	25,006	603	402	769	24.1	16.1	26.0	15.7
Newburg	26,500	520	526	291	19.6	19.8	16.1	19.2
New Rochelle	20,480	448	346	209	21.9	10.2	27.9	16.0
New York (Greater)	4,152,860	111,773	‡76,203	48,355	26.9	18.3	24.6	19.1
By Boroughs:								
Manhattan	2,174,335	63,006	39,831	32,342	29.0	18.3	....	....
Bronx	290,097	7,306	6,277	2,027	25.1	21.6	....	....
Brooklyn	1,404,569	34,538	25,024	11,966	24.6	17.8	....	....
Queens	209,685	5,050	3,583	1,420	24.1	17.1	....	....
Richmond	74,173	1,873	1,488	600	25.2	20.0	....	....
Niagara Falls	26,560	567	431	601	21.3	16.2	21.2	17.5
North Tonawanda	10,157	270	140	122	26.5	13.8	23.2	12.7
Ogdensburg	13,179	324	266	225	24.6	20.2	19.5	19.3
Olean	10,163	211	143	337	20.8	14.1	19.4	12.3
Oneida	8,420	168	132	89	20.0	15.7	16.3	14.5
Oswego	22,572	407	376	158	18.0	16.7	16.7	15.9
Plattsburg	10,715	179	130	126	17.6	12.8	24.1	16.7
Poughkeepsie	25,379	471	441	317	18.6	17.4	20.1	18.4
Rensselaer	10,715	137	163	77	12.8	15.2	14.4	17.9
Rochester	181,666	3,800	§2,866	2,029	20.9	15.8	18.8	14.8

Rome	16,562	409	338	123	24.7	20.4	20.0	19.3
Schenectady	71,205	1,722	901	623	24.2	12.6	21.0	15.6
Syracuse	117,500	2,028	¶1,846	861	17.2	15.7	15.5	14.9
Tonawanda	7,904	159	83	103	20.1	10.5	17.7	13.2
Troy	76,910	896	**1,551	563	11.6	20.2	11.0	21.0
Utica	62,934	1,350	1,028	449	21.5	19.5	20.4	17.9
Watertown	25,447	445	461	306	17.5	18.1	17.7	16.1
Watervliet	14,600	211	248	85	14.5	17.0	11.2	16.8
Yonkers	61,716	1,554	1,095	691	25.1	17.7	24.5	17.8

*Including 154 non-residents, making the actual death rate 16.1.
†Including 338 non-residents, making the actual death rate 15.4.
‡Including 1,759 non-residents, making the actual death rate 17.9.
§Including 207 non-residents, making the actual death rate 14.6.
¶Including 67 non-residents, making the actual death rate 14.6.
**Including 197 non-residents, making the actual death rate 17.6.

The above table includes deaths of nonresidents occurring in the cities, except as indicated by footnotes, and in the following cities, where deaths occurring in State institutions are excluded: Auburn State Prison, Binghamton State Hospital, Elmira Reformatory, Middletown State Hospital, Ogdensburg, St. Lawrence State Hospital, Poughkeepsie, Hudson River State Hospital, Rome State Custodial Asylum, Utica State Hospital.

Cities Showing a Decrease in Death Rate

As compared with last year, the following cities show a lower death rate for 1906: Albany, Cohoes, Corning, Elmira, Fulton, Hornell, Hudson, Jamestown, Johnstown, Kingston, Lockport, Middletown, New Rochelle, North Tonawanda, Oswego, Plattsburgh, Rensselaer, Schenectady, Tonawanda, Troy, Watervliet.

The Following Cities Show an Increased Death Rate

Amsterdam, Auburn, Buffalo, Cortland, Dunkirk, Geneva, Gloversville, Little Falls, Mt. Vernon, Newburgh, Ogdensburg, Olean, Poughkeepsie, Rome, Utica, Watertown and Yonkers, but several of these cities have a low death rate — Cortland, Gloversville, Little Falls and Olean below the average city death rate.

Rome, Ogdensburg and Troy are shown to have the highest death rate, and Jamestown and Tonawanda the lowest.

The average city death rate was 15.9 and the birth rate 19.7 per 1,000 population.

The birth and death rate of cities, grouped in order of population, is shown to be as follows:

	Population	Birth Rate	Death Rate
Cities of.......	100,000 to 400,000	17.3	16.3
Cities of.......	50,000 to 100,000	20.7	17.5
Cities of.......	20,000 to 50,000	19.9	16.2
Cities of.......	10,000 to 20,000	20.0	15.9

City Registration of Births

In last year's report the apparent incomplete registration of births was pointed out, as shown by the number of cities reporting a less number of births than deaths.

While there are several cities which show an increased registration over last year, it will be observed from the above table that the following cities have reported more deaths than births: Albany, Cohoes, Hudson, Middletown, Newburg, Rensselaer, Troy, Watertown and Watervliet.

Dunkirk, Greater New York and North Tonawanda show the largest birth rate, and Albany and Troy the smallest.

The registrar of vital statistics of the city of Middletown reports that there have been 1,500 births in the city which have not been reported to the local board of health, and it is a well-known fact that in the cities of Cohoes and Troy many births occur which are not reported.

Appeals to the city authorities having failed to bring about a more complete registration of births in the cities of Cohoes and Troy, the Department wrote to each of the physicians in the cities requesting them to file all outstanding certificates of births, but apparently the physicians consider these records of but little value, as there were but 896 births reported to the Troy city board of health, while 1,531 deaths were recorded during the year.

It is evident that the registration of births in these cities will not be made complete, as required by the provisions of section 22 of the Public Health Law, unless the State Commissioner of Health exercises the authority vested in him by section 5 and sends a representative to take charge of the registration, the expenses incurred thereby being a charge upon the municipality.

What can be done to improve the registration in cities is plainly shown by the interest taken in the matter during the past few years by the energetic registrar of vital statistics in the city of Schenectady.

In 1903 there were reported but 808 births in the city, while the deaths were 795. The following year 1,305 births were reported as against 791 deaths, and this record was improved upon during 1905. By referring to the table showing the city registration for 1906 it will be seen that the city of Schenectady shows one of the highest birth rates in the State.

Certificates Filed with Department

The certificates filed with the Department from the registration districts in the State outside of the cities of Albany, Buffalo, Greater New York and Yonkers during the year 1906, were as follows:

MONTH	Births.	Deaths.	Marriages.
January	4,354	4,693	2,572
February	4,376	4,400	2,302
March	5,091	5,005	2,000
April	4,916	4,890	2,296
May	4,902	4,722	2,041
June	4,799	3,992	3,682
July	5,007	4,330	2,579
August	5,099	4,985	2,670
September	5,520	4,842	3,063
October	5,875	4,811	3,385
November	5,332	4,344	3,254
December	5,886	4,696	3,396
Total	61,157	55,710	33,240

State Registration by Districts

The following tables show the total registration of births, deaths and marriages by registration districts in the several counties of the State. In giving the population of towns including incorporated villages, the town is credited with the inhabitants residing outside of the village limits, as that territory constitutes a separate registration district from the village.

Albany County

	Population.	BIRTHS.		DEATHS.		MARRIAGES.	
		1906.	1905.	1906.	1905.	1906.	1905.
Albany, city	98,374	986	996	1766	1,809	610	595
Altamont, village	669	7	4	11	11	8	3
Berne, town	1,915	15	20	33	25	17	23
Bethlehem, town	4,451	44	42	54	59	16	16
Coeymans, town	4,264	93	84	54	62	30	27
Cohoes, city	24,183	406	518	466	519	525	179
Colonie, town	*7,845	81	66	112	129	25	23
Green Island, town	.....	.....	.....	.....	.....	.....	.....
Green Island, village	4,878	87	92	85	99	45	43
Guilderland, town	2,871	31	31	36	37	19	16
Knox, town	1,174	7	5	18	16	12	3
New Scotland, town	2,536	26	23	20	36	19	15
Rensselaerville, town	1,682	19	23	32	29	9	5
Voorheesville, village	479	2	6	6	3	7	10
Watervliet, city	14,600	211	216	248	288	85	68
Westerlo, town	1,558	13	15	28	22	9	14
Total	171,497	2,028	2,141	2,969	3,144	1,436	1,040

*Town and village have same boundaries.

Allegany County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Alfred, town	872	15	13	9	4	1	3
Alfred, village	912	19	17	12	11	26	14
Allen, town	631	17	9	2	7	5	3
Alma, town	1,064	22	17	7	7	8	4
Almond, town	1,429	16	15	16	22	11	9
Amity, town	1,130	15	35	15	14	.....	5
Andover, town	882	21	9	8	6	3	1
Andover, village	1,097	12	12	17	20	15	13
Angelica, town	575	6	12	16	21	.....	4
Angelica, village	1,101	13	8	14	20	10	12
Belfast, town	1,640	25	29	19	21	8	22
Belmont, village	1,207	20	19	12	15	22	16
Birdsall, town	653	7	8	6	4	3	1
Bolivar, town	938	24	25	7	15	1	5
Bolivar, village	1,368	16	19	13	12	25	18
Burns, town	731	13	10	14	13	1	2
Canaseraga, village	730	11	8	10	11	13	11
Caneadea, town	1,387	26	19	25	25	13	8
Centreville, town	1,029	14	17	8	12	5	6
Clarksville, town	838	13	7	9	3	9	9
Cuba, town	821	14	10	9	12	4	2
Cuba, village	1,519	14	23	37	24	21	27
Friendship, town	978	18	8	15	10	4	5
Friendship, village	1,259	15	17	19	14	25	11
Genesee, town	1,146	18	12	13	10	30	23
Granger, town	761	15	7	5	9	2	12
Grove, town	766	8	13	5	8	2	7
Hume, town	1,817	25	12	25	28	18	19
Independence, town	1,222	22	20	11	10	57	32
New Hudson, town	879	15	12	13	12	3	7
Richburg, village	375	11	6	3	5	4	7
Rushford, town	1,432	22	34	17	13	7	6
Scio, town	1,354	20	17	14	17	9	7
Ward, town	521	7	10	1	8	.....	2
Wellsville, town	1,366	48	34	9	11	8	9
Wellsville, village	4,355	84	84	66	57	81	76
West Almond, town	548	5	4	3	8	2	3
Willing, town	1,120	9	6	11	3	12	19
Wirt, town	788	6	10	2	7	2	2
Total	43,257	701	647	517	529	470	442

Broome County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Barker, town	984	15	15	18	15	7	4
Binghamton, town	703	13	5	9	8	3	1
Binghamton, city	42,036	715	645	678	676	1,150	885
Chenango, town	1,314	21	17	20	27	8	16
Colesville, town	2,457	30	28	38	46	23	17
Conklin, town	935	12	10	8	8	7	11
Deposit, village	2,136	28	29	51	31	33	17
Dickinson, town	277	8	2	26	31	.....	.....
Fenton, town	1,145	16	16	21	14	8	9
Kirkwood, town	887	4	7	8	19	12	12
Lestershire, village	4,035	68	85	64	48	66	70
Lisle, town	1,173	20	24	17	11	6	3
Lisle, village	378	2	3	2	3	9	6
Maine, town	1,411	10	16	20	24	12	13
Nanticoke, town	621	10	13	3	16	2	2
Port Dickinson, village	426	9	4	1	6	6	8
Sanford, town	1,288	25	23	27	24	20	12
Triangle, town	884	10	13	20	17	3	2
Union, town	2,657	51	45	41	30	10	15
Union, village	1,454	29	32	24	25	42	28
Vestal, town	1,681	21	17	23	23	9	10
Whitney's Point, village	[illegible]749	10	7	12	15	10	10
Windsor, town	1,943	20	21	29	36	7	3
Windsor, village	691	6	8	8	8	60	48
Total	72,282	1,153	1,085	1,168	1,161	1,514	1,202

Cattaraugus County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Allegany, town	2,224	40	74	28	39	9	39
Allegany, village	1,330	22	.....	17	....	17	......
Ashford, town	1,567	25	25	3	12	10	8
Carrollton, town	879	4	2	6	9	1	2
Cattaraugus, village	1,184	20	23	15	20	17	15
Cold Spring, town	713	7	13	10	15	4	5
Conewango, town	1,162	8	11	11	16	5	7
Dayton, town	1,754	37	18	18	22	21	31
East Otto, town	1,111	15	20	14	11	8	2
East Randolph, village	644	3	3	19	15	5	12
Elko, town	324	7	10	10	4	1	1
Ellicottville, town	1,071	19	20	19	7	3	4
Ellicottville, village	1,044	15	21	13	11	16	12
Farmersville, town	1,014	17	17	14	13	8	6
Franklinville, town	1,025	23	17	12	19	11	5
Franklinville, village	1,485	19	11	20	23	10	8
Freedom, town	1,229	13	11	14	14	5	14
Gowanda, village	*2,063	45	34	23	19	19	18
Great Valley, town	2,167	21	27	20	20	6	13
Hinsdale, town	1,152	17	20	23	19	8	3
Humphrey, town	680	3	12	10	14	1	1
Ischua, town	811	17	22	7	15	8	5
Leon, town	845	11	12	10	13	2	......
Limestone, village	721	23	1	2	1	159	147
Little Valley, town	497	3	11	8	5	1	......
Little Valley, village	1,225	15	21	15	8	19	13
Lyndon, town	647	13	4	3	8	1	7
Machias, town	1,494	19	18	31	35	11	16
Mansfield, town	940	16	10	6	10	1	1
Napoli, town	791	19	18	10	15	1	4
New Albion, town	863	14	13	15	16	2	1
North Olean, village	1,761	47	43	17	22	.....	......
Olean, town	3,380	71	82	45	40	62	29
Olean, city	10,163	211	217	143	122	387	300
Otto, town	927	13	19	11	10	10	12
Perrysburg, town	1,049	10	10	16	14	5	8
Persia, town	1,858	1	1	3	5	1	......
Portville, town	1,624	29	19	17	11	9	8
Portville, village	774	16	13	8	11	52	34
Randolph, town	539	6	12	6	13	7	2
Randolph, village	1,163	13	11	22	12	14	7
Red House, town	564	9	8	3	4	3	......
Salamanca, town	415	.....	11	3	8	1	7
Salamanca, village	5,455	129	151	68	56	104	126
South Valley, town	562	15	4	7	5	3	5
West Salamanca, village	558	8	4	6	2	15	12
Yorkshire, town	1,730	14	26	28	25	7	9
Total	66,196	1,122	1,150	829	800	1,020	959

Cayuga County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Auburn, city	31,422	638	655	543	517	360	381
Aurelius, town	1,148	22	4	15	11	4	4
Brutus, town	993	11	15	20	16	5	4
Cato, town	1,160	12	20	13	19	9	6
Cato, village	357	3	2	1	4	1	2
Cayuga, village	400	9	3	6	10	2	1
Conquest, town	1,187	7	12	19	20	2	3
Fair Haven, village	660	14	8	14	11	8	7
Fleming, town	1,006	21	14	16	9	3	2
Genoa, town	1,866	15	16	20	27	8	10
Ira, town	1,230	16	16	15	18	1	5
Ledyard, town	1,996	25	27	29	21	7	14
Locke, town	914	13	12	17	11	4	9
Mentz, town	869	17	10	20	12	3	1
Meridian, village	314	2	5	8	4	5	5

* Part of village in Erie county.

Cayuga County — Continued

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Montezuma, town	914	18	21	16	11	9	5
Moravia, town	1,234	6	4	11	9	2	1
Moravia, village	1,489	9	13	33	22	21	20
Niles, town	1,159	21	14	17	21	7	4
Owasco, town	1,302	18	15	19	21	0	3
Port Byron, village	1,016	22	14	29	22	11	11
Scipio, town	1,512	14	18	22	23	10	3
Sempronius, town	594	12	3	10	13	3	1
Sennett, town	1,859	25	16	31	49	4	4
Springport, town	446	14	9	13	14	4	4
Sterling, town	1,844	28	30	29	36	15	5
Summer Hill, town	669	4	7	15	19	4	......
Throop, town	984	4	4	11	11	5	2
Union Springs, village	890	12	13	11	11	9	11
Venice, town	1,309	12	6	17	23	10	12
Victory, town	1,316	16	15	9	15	1	10
Weedsport, village	1,495	13	13	30	28	17	14
Total	65,309	1,073	1,034	1,079	1,058	554	564

Chautauqua County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Arkwright, town	863	8	11	9	9	3	4
Brocton, village	1,056	20	21	11	6	14	16
Busti, town	1,534	23	19	17	12	18	15
Carroll, town	1,638	34	27	24	13	46	50
Celoron, village	700	17	16	10	8	9	8
Charlotte, town	684	9	12	4	10	4	......
Chautauqua, town	3,505	22	22	65	71	11	13
Chautauqua Lake Association, village	*	3	3	5	4	3	9
Cherry Creek, town	807	21	21	10	10	3	9
Cherry Creek, village	634	4	15	6	8	13	11
Clymer, town	1,180	18	19	12	16	66	69
Dunkirk, town	438	18	17	9	14	1	......
Dunkirk, city	15,255	577	480	246	215	232	180
Ellery, town	1,638	30	23	19	17	13	6
Ellicott, town	1,561	14	11	19	15	10	7
Ellington, town	1,264	12	22	22	22	9	10
Falconer, village	1,643	39	31	27	15	27	35
Forestville, village	680	3	9	9	13	8	5
Fredonia, village	5,148	135	101	69	78	92	64
French Creek, town	951	4	12	14	12	12	29
Gerry, town	1,146	18	19	21	9	4	7
Hanover, town	2,396	45	29	40	36	14	13
Harmony, town	2,407	46	34	39	26	27	26
Jamestown, city	26,160	511	537	276	318	190	672
Kiantone, town	524	9	5	6	3	.....	......
Lakewood, village	552	1	9	10	7	3	10
Mayville, village	1,021	19	10	14	17	59	51
Mina, town	1,012	16	28	19	7	20	13
Panama, village	375	2	3	7	10	7	6
Poland, town	1,497	23	24	18	24	8	6
Pomfret, town	2,160	42	37	26	26	10	8
Portland, town	1,998	28	24	30	17	10	13
Ripley, town	2,257	42	30	27	29	251	278
Sheridan, town	1,861	26	10	21	17	3	6
Sherman, town	709	7	22	10	9	3	4
Sherman, village	797	16	14	13	20	8	20
Silver Creek, village	2,073	46	5	33	37	23	21
Sinclairville, village	507	7	8	8	6	4	6
Stockton, town	1,821	19	17	28	21	10	4
Villenova, town	1,054	26	22	23	14	6	5
Westfield, town	1,531	26	19	19	21	3	9
Westfield, village	2,823	52	52	46	42	81	73
Total	96,880	2,038	1,850	1,341	1,284	1,938	1,791

* Population included in that of the town of Chautauqua.

Chemung County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Ashland, town	359	9	2	7	4	.....	2
Baldwin, town	506	9	5	5	7	3	3
Big Flats, town	1,571	24	30	36	22	8	11
Catlin, town	912	11	9	12	16	1	4
Chemung, town	1,328	13	24	18	15	12	13
Elmira, town	1,377	8	7	12	14	1	6
Elmira, city	34,678	536	551	513	544	677	20
Elmira Heights, village	*1,969	45	44	23	19	29	30
Erin, town	898	22	10	18	12	5	10
Horseheads, town	3,016	24	17	33	36	12	5
Horseheads, village	1,810	26	34	33	34	44	37
Southport, town	2,073	29	20	29	29	26	36
Van Etten, town	666	11	9	5	10	2	5
Van Etten, village	420	2	9	7	8	14	11
Veteran, town	1,475	21	21	21	27	15	8
Wellsburg, village	481	9	7	8	5	22	23
Total	51,600	799	799	780	802	871	824

Chenango County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Afton, town	1,144	18	2	11	24	24	14
Afton, village	707	17	1	14	13	.....	2
Bainbridge, town	855	15	1	15	7	5	2
Bainbridge, village	1,113	11	1	23	28	18	15
Columbus, town	863	17	9	10	9	3	4
Coventry, town	889	5	8	6	12	2	3
German, town	430	8	4	2	5	3	1
Greene, town	1,806	27	28	27	27	12	6
Greene, village	1,358	17	11	23	18	14	13
Guilford, town	2,261	28	31	29	21	12	10
Lincklaen, town	607	12	10	8	8	4	6
McDonough, town	816	10	15	13	12	10	9
New Berlin, town	1,297	5	6	18	15	6	7
New Berlin, village	1,128	15	14	12	18	19	10
North Norwich, town	742	9	12	9	10	1	3
Norwich, town	1,332	16	15	23	32	3	19
Norwich, village	7,115	109	92	119	131	76	66
Otselic, town	1,111	16	12	13	14	7	1
Oxford, town	1,393	21	15	37	32	2	4
Oxford, village	1,865	35	43	30	43	21	18
Pharsalia, town	690	4	16	9	11	3	1
Pitcher, town	740	11	12	8	10	9	6
Plymouth, town	995	8	7	15	10	6	9
Preston, town	626	7	7	13	18	4	4
Sherburne, town	1,768	23	27	20	22	6	6
Sherburne, village	927	14	3	21	22	19	15
Smithville, town	994	16	13	16	20	3	4
Smyrna, town	922	16	17	13	6	8	8
Smyrna, village	271	6	4	4	8	5	1
Total	36,783	516	436	561	606	305	267

* Part of village in town of Horseheads.

Clinton County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Altona, town	2,500	77	76	24	32	17	14
Ausable, town	2,399	29	36	21	18	1	7
Beekmantown, town	1,889	15	13	28	33	5	2
Black Brook, town	2,129	10	2	22	24	18	39
Champlain, town	1,767	71	63	22	16	8	9
Champlain, village	1,400	40	72	19	29	14	22
Chazy, town	2,835	107	89	48	40	46	40
Clinton, town	1,590	33	36	23	17	3	9
Dannemora, town	2,084	67	64	39	16	6	4
Dannemora, village	633	8	1	13	10	10	8
Ellenburgh, town	3,201	77	51	12	9	26	15
Mooers, town	2,825	76	63	37	34	20	9
Mooers, village	537	26	14	14	13	13	12
Peru, town	2,354	53	52	25	36	13	16
Plattsburgh, town	2,475	60	69	34	24	25	24
Plattsburgh, city	10,184	179	253	130	180	126	183
Rouse's Point, village	1,674	11	17	7	7	48	27
Saranac, town	3,156	80	111	42	39	19	25
Schuyler Falls, town	1,642	12	14	24	23	20	15
Total	47,282	1,031	1,096	584	600	438	480

Columbia County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Ancram, town	1,212	17	15	18	16	3	8
Austerlitz, town	926	9	17	16	14	3	7
Canaan, town	1,266	5	5	14	17	15	31
Chatham, town	1,403	19	17	51	38	13	11
Chatham, village	2,090	33	21	19	48	36	32
Claverack, town	2,488	39	26	29	31	25	19
Clermont, town	768	18	8	8	8	6	1
Copake, town	1,346	20	23	23	13	5	8
Gallatin, town	751	7	13	15	10	3	3
Germantown, town	1,634	33	24	17	24	2	4
Ghent, town	2,581	24	16	55	54	9	5
Greenport, town	1,151	16	18	15	13	3	6
Hillsdale, town	1,423	9	9	24	29	10	17
Hudson, city	10,290	201	152	202	207	83	56
Kinderhook, town	1,131	15	16	23	16	2	4
Kinderhook, village	856	13	8	15	15	9	12
Livingston, town	1,605	20	24	25	28	17	5
New Lebanon, town	1,498	18	13	24	28	29	21
Philmont, village	1,971	24	22	10	22	8	13
Stockport, town	2,569	44	37	42	33	19	8
Stuyvesant, town	1,908	40	30	26	35	9	6
Taghkanic, town	760	17	13	18	11	5	1
Valatie, village	1,231	26	21	26	25	13	22
Total	42,868	667	548	715	735	327	300

Cortland County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Cincinnatus, town	1,033	20	28	11	20	11	9
Cortland, city	11,272	165	180	150	122	107	116
Cortlandville, town	2,167	19	27	45	37	2	6
Cuyler, town	945	19	12	20	11	13	9
Freetown, town	539	10	4	4	10	3	1
Harford, town	679	8	8	15	11	7	3
Homer, town	1,487	22	19	16	22	5	1
Homer, village	2,536	39	34	50	42	26	22
Lapeer, town	442	7	12	3	6	3	2
McGrawville, village	879	9	9	9	22	23	6
Marathon, town	516	8	4	1	4	4	1
Marathon, village	1,042	9	13	13	24	15	15
Preble, town	841	7	6	11	11	5	8
Scott, town	708	13	17	12	18	5	4
Solon, town	540	8	9	9	3	4	1
Taylor, town	759	10	14	11	9	6	4
Truxton, town	1,186	21	20	24	16	2	2
Virgil, town	1,239	18	18	24	21	7	7
Willet, town	685	16	14	4	24	6	8
Total	29,503	428	448	432	433	254	225

Delaware County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Andes, town	1,529	13	14	26	29	10	8
Andes, village	340	2	1	4	5	1	2
Bovina, town	916	17	9	8	9	5	8
Colchester, town	3,070	62	59	42	38	14	16
Davenport, town	1,560	26	26	29	12	7	12
Delhi, town	1,127	17	23	26	27	4	8
Delhi, village	1,781	36	18	26	25	19	24
Deposit, town	1,895	24	14	14	9	5	8
Franklin, town	1,951	32	30	22	31	8	8
Franklin, village	493	5	6	13	14	3	5
Hamden, town	1,386	32	22	17	17	15	8
Hancock, town	4,320	59	75	41	15	23	25
Hancock, village	1,381	17	33	18	4	50	56
Harpersfield, town	1,244	17	4	14	13	8	4
Hobart, village	503	4	5	14	11	2	9
Kortright, town	1,527	29	32	14	18	5	8
Margaretville, village	583	9	9	11	12	11	9
Masonville, town	1,120	18	15	16	18	5	4
Meredith, town	1,469	17	23	16	15	12	5
Middletown, town	3,236	66	61	45	43	29	29
Roxbury, town	2,206	19	27	28	32	8	5
Sidney, town	1,787	36	26	25	24	11	9
Sidney, village	2,532	40	48	30	37	34	31
Stamford, town	1,997	11	9	10	10	8	5
Stamford, village	*973	16	15	28	27	8	14
Tompkins, town	2,277	35	46	27	20	10	9
Walton, town	2,085	29	37	20	20	6	11
Walton, village	2,911	26	32	31	39	36	37
Total	46,788	714	719	615	574	357	377

* Part of village in Schoharie county.

Dutchess County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Amenia, town	2,152	42	42	32	35	20	29
Beekman, town	933	12	11	12	21	2	5
Clinton, town	1,275	16	8	14	11	6	3
Dover, town	1,992	48	52	43	50	20	22
East Fishkill, town	2,088	45	35	36	37	18	12
Fishkill, town	3,081	81	63	61	51	1	3
Fishkill, village	579	9	4	5	8	10	10
Fishkill Landing, village	3,939	81	89	67	60	33	33
Hyde Park, town	2,944	33	45	40	43	17	19
La Grange, town	1,271	22	23	25	19	6	8
Matteawan, village	5,584	116	106	117	90	48	45
Milan, town	926	13	18	20	15	8	3
Millbrook, village	1,121	31	28	5	19	10	8
Millerton, village	775	8	9	8	20	64	66
North East, town	1,288	28	33	19	16	3	4
Pawling, town	1,107	27	23	16	16	4	6
Pawling, village	733	11	23	10	7	10	14
Pine Plains, town	1,315	17	34	26	17	11	6
Pleasant Valley, town	997	11	16	17	14	2	7
Pleasant Valley, village	429	4	6	4	4	5	4
Poughkeepsie, town	5,380	55	65	47	67	6	10
Poughkeepsie, city	25,379	471	532	441	418	317	271
Red Hook, town	1,261	30	21	19	22	15	10
Red Hook, village	1,572	18	16	10	19	12	7
Rhinebeck, town	2,063	27	32	33	29	16	17
Rhinebeck, village	1,547	37	31	30	29	15	14
Stanford, town	1,641	21	34	23	38	8	8
Tivoli, village	1,041	16	16	17	12	4	7
Union Vale, town	976	16	9	14	28	3	1
Wappinger, town	752	20	17	27	22	10	10
Wappingers Falls, village	3,588	70	59	38	70	29	13
Washington, town	1,892	35	27	38	51	12	10
Total	81,633	1,471	1,427	1,314	1,358	745	685

Erie County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Akron, village	1,720	33	34	24	19	14	18
Alden, town	1,742	32	26	32	31	12	6
Alden, village	711	14	19	6	7	7	10
Amherst, town	3,526	37	61	45	37	16	5
Angola, village	806	11	9	17	10	13	15
Aurora, town	1,732	42	39	24	41	5	28
Blasdell, village	702	29	24	11	5	2	1
Boston, town	1,627	17	19	11	16	6	5
Brant, town	1,482	26	29	26	30	10	8
Buffalo, city	376,587	8,075	8,139	6,138	5,656	4,118	3,916
Cheektowaga, town	5,425	38	44	88	91	26	24
Clarence, town	2,817	57	50	30	41	22	25
Colden, town	1,307	30	30	24	21	10	9
Collins, town	*2,602	24	30	25	40	20	17
Concord, town	2,222	25	37	36	19	6	7
Depew, village	3,535	79	84	56	34	46	45
East Aurora, village	2,448	36	16	22	26	33	9
East Hamburg, town	2,575	47	55	38	33	8	8
Eden, town	2,495	41	35	24	27	19	12
Elma, town	2,155	39	36	33	39	2	6
Evans, town	2,061	25	17	31	33	17	11

* Including population of village of Gowanda in Erie county.

Erie County — Continued

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Farnham, village	516	17	11	10	7	6	11
Grand Island, town	972	13	11	10	8	3	3
Hamburg, town	3,210	86	57	55	59	30	30
Hamburg, village	1,967	37	29	19	20	14	18
Holland, town	1,451	28	22	20	17	11	11
Kenmore, village	506	1	4	.....	......	2	3
Lancaster, town	1,570	36	31	26	35	5	9
Lancaster, village	3,853	94	95	46	63	50	41
Marilla, town	1,513	10	21	12	11	10	9
Newstead, town	2,052	21	23	27	15	2	4
North Collins, town	2,514	44	45	29	33	13	12
Sardinia, town	1,843	21	23	16	14	8	7
Sloan, village	1,246	20	12	6	9	1	......
Springville, village	2,230	51	25	27	30	20	27
Tonawanda, town	1,005	11	1	24	16	6	3
Tonawanda, city	7,904	159	109	83	101	103	61
Wales, town	1,207	16	25	12	11	4	7
West Seneca, town	14,925	371	328	291	247	53	71
Williamsville, village	967	18	16	7	16	18	22
Total	473,700	9,811	9,721	7,461	6,968	4,771	4,534

Essex County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Chesterfield, town	*2,117	27	21	30	18	3	2
Crown Point, town	1,890	24	26	39	33	23	34
Elizabethtown, town	678	14	7	10	4	5	3
Elizabethtown, village	519	4	6	7	5	5	5
Essex, town	1,344	27	32	21	26	9	8
Jay, town	1,985	36	21	39	37	20	20
Keene, town	1,328	20	15	20	15	4	9
Keeseville, village	†1,955	48	52	36	35	30	35
Lake Placid, village	1,514	38	51	20	24	18	21
Lewis, town	1,049	9	12	15	22	2	4
Minerva, town	1,012	16	11	15	11	14	1
Moriah, town	3,644	89	76	56	58	25	19
Newcomb, town	554	1	6	4	6	.....	......
North Elba, town	1,487	21	15	19	11	1	1
North Hudson, town	505	1	3	5	3	.....	3
Port Henry, village	2,073	85	67	41	37	38	18
St. Armand, town	879	10	12	15	16	9	10
Schroon, town	1,213	24	18	15	24	4	5
Ticonderoga, town	2,942	50	42	39	38	10	11
Ticonderoga, village	1,749	69	44	22	19	37	38
Westport, town	1,763	30	31	19	28	22	11
Willsboro, town	1,629	36	34	12	16	6	5
Wilmington, town	574	25	13	12	8	4	1
Total	32,452	704	615	511	494	289	264

* Including population of village of Keeseville, in Essex county.
† Part of village in Clinton county.

Franklin County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Altamont, town	2,074	47	38	29	20	6	6
Bangor, town	2,184	34	43	50	38	34	17
Belmont, town	2,403	50	49	20	19	8	7
Bombay, town	1,386	38	31	50	53	26	21
Brandon, town	920	26	20	12	6	1	2
Brighton, town	794	6	13	10	6	.....	1
Burke, town	1,875	48	23	24	17	10	15
Chateaugay, town	1,587	52	23	26	27	4	3
Chateaugay, village	1,064	17	14	6	10	20	17
Constable, town	1,355	27	38	24	21	13	10
Dickinson, town	1,762	71	41	17	21	9	7
Duane, town	372	11	5	5	4	2	......
Fort Covington, town	1,226	43	26	22	21	.....	1
Fort Covington, village	854	11	25	24	12	15	25
Franklin, town	1,496	19	30	24	31	7	8
Harrietstown, town	*4,113	3	6	13	16	.....	......
Malone, town	4,248	86	120	59	64	14	8
Malone, village	6,478	139	117	99	115	107	101
Moira, town	2,477	49	72	31	39	33	26
Santa Clara, town	1,053	16	21	11	7	2	3
Saranac Lake, village	†3,834	85	67	103	105	46	36
Tupper Lake, village	2,769	84	73	34	74	9	40
Waverly, town	2,160	62	77	24	25	19	44
Westville, town	1,149	18	19	24	17	1	3
Total	47,012	1,042	991	741	768	386	401

Fulton County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Bleecker, town	527	16	8	4	7	2	2
Broadalbin, town	1,933	39	24	33	26	17	8
Caroga, town	449	16	5	7	10	.....	3
Ephratah, town	1,479	25	15	19	23	7	10
Gloversville, city	18,672	327	316	276	235	210	177
Johnstown, town	2,493	31	14	39	50	.....	2
Johnstown, city	9,845	167	162	120	145	77	97
Mayfield, town	1,526	23	15	25	23	1	5
Mayfield, village	603	12	15	5	7	5	9
Northampton, town	1,131	17	18	21	11	10	6
Northville, village	1,073	11	17	18	10	27	27
Oppenheim, town	1,258	12	8	20	7	1	3
Perth, town	676	5	3	3	7	3	1
Stratford, town	652	19	12	13	15	.....	2
Total	42,330	720	632	603	576	360	352

* Includes population of village of Saranac Lake in Franklin county.
† Part of village in Essex county.

Genesee County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Alabama, town	1,644	28	30	23	30	14	4
Alexander, town	1,210	14	11	14	21	5	.....
Alexander, village	207	3	1	4	10	1	1
Batavia, town	2,301	26	11	26	36	4	2
Batavia, village	10,080	107	138	160	177	121	88
Bergen, town	1,013	11	22	13	14	3	3
Bergen, village	601	9	4	15	8	6	2
Bethany, town	1,259	13	19	25	33	6	5
Byron, town	1,505	27	29	20	14	5	14
Corfu, village	481	15	9	14	12	7	3
Darien, town	1,850	15	21	23	28	9	8
Elba, town	1,140	11	22	10	19	6	6
Elba, village	404	9	8	6	7	4	5
Le Roy, town	1,712	30	29	21	18	8	14
Le Roy, village	3,395	69	82	54	61	37	13
Oakfield, town	929	23	18	26	18	3	8
Oakfield, village	873	19	26	16	18	7	9
Pavilion, town	1,546	2	15	27	22	8	11
Pembroke, town	1,968	28	26	20	22	15	13
Stafford, town	1,319	23	17	20	14	6	5
Total	35,878	482	538	537	582	275	214

Greene County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Ashland, town	647	12	8	6	10	2	7
Athens, town	801	10	10	16	11	2	6
Athens, village	2,015	35	17	33	36	8	14
Cairo, town	1,960	30	22	37	48	7	11
Catskill, town	3,569	56	50	50	55	24	23
Catskill, village	5,294	95	91	97	98	46	46
Coxsackie, town	1,377	22	21	21	22	1	8
Coxsackie, village	2,940	81	67	60	50	23	20
Durham, town	1,616	18	19	25	35	8	9
Greenville, town	1,626	26	18	24	22	13	14
Halcott, town	363	7	9	5	10	1	1
Hunter, town	1,418	28	34	17	23	25	18
Hunter, village	524	6	17	7	6	.....	1
Jewett, town	1,044	5	12	9	10	1	7
Lexington, town	1,067	16	9	21	21	1	7
New Baltimore, town	2,087	32	31	29	32	15	17
Prattsville, town	761	12	15	16	17	12	5
Tannersville, village	589	19	12	11	10	2	1
Windham, town	1,427	27	27	33	20	10	14
Total	31,130	537	489	517	531	201	229

Hamilton County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Arietta, town	295	3	5	3	2	.....	1
Benson, town	215	2	1	5	5	.....	......
Hope, town	317	5	5	2	1	2	......
Indian Lake, town	1,049	29	20	14	10	10	12
Inlet, town	168	2	3	4	5	.....	1
Lake Pleasant, town	494	10	6	8	5	3	6
Long Lake, town	1,233	16	23	7	8	4	5
Morehouse, town	216	2	.....	1	3	.....	1
Wells, town	925	6	7	7	5	4	9
Total	4,912	75	70	51	44	23	35

Herkimer County

	Population.	Births. 1906.	Births. 1905.	Deaths. 1906.	Deaths. 1905.	Marriages. 1906.	Marriages. 1905.
Cold Brook, village	318	3	5	5	5	2	2
Columbia, town	1,180	16	1	17	7	4	3
Danube, town	934	6	5	11	11	1	.....
Dolgeville, village	*2,245	34	53	30	29	13	27
Fairfield, town	753	9	7	12	10	1	3
Frankfort, town	1,747	27	22	27	35	5	10
Frankfort, village	2,870	93	80	48	39	27	15
German Flats, town	1,521	.....	4	18	24	4	6
Herkimer, town	1,227	15	13	25	6	.....	3
Herkimer, village	6,596	104	102	114	79	88	58
Ilion, village	5,924	96	85	83	54	33	33
Litchfield, town	881	11	9	5	14	.....	2
Little Falls, town	685	6	3	7	2	3	3
Little Falls, city	11,122	204	191	150	131	94	106
Manheim, town	†2,887	8	10	6	8	1	4
Middleville, village	597	5	6	6	9	2	3
Mohawk, village	2,044	30	23	36	29	20	19
Newport, town	1,018	7	6	6	12	1	4
Newport, village	672	5	4	18	10	5	3
Norway, town	682	5	8	12	7	3	3
Ohio, town	704	13	7	11	3	7	4
Old Forge, village	500	10	9	5	3	.....	.....
Poland, village	366	5	1	6	4	2	1
Russia, town	1,372	14	22	13	12	4	8
Salisbury, town	1,373	20	19	26	25	8	12
Schuyler, town	1,192	9	13	6	13	5	4
Stark, town	999	19	6	18	14	3	2
Warren, town	1,152	16	13	14	21	8	4
Webb, town	1,255	12	12	15	15	4	5
West Winfield, village	749	9	7	16	12	58	5
Wilmurt, town	309	2	5	2	7	.....	.....
Winfield, town	711	10	11	9	12	.....	.....
Total	53,856	823	762	777	662	406	352

Jefferson County

	Population.	Births. 1906.	Births. 1905.	Deaths. 1906.	Deaths. 1905.	Marriages. 1906.	Marriages. 1905.
Adams, town	1,728	19	30	30	29	8	15
Adams, village	1,449	15	29	21	36	20	21
Alexandria, town	2,407	47	45	25	37	22	17
Alexandria Bay, village	1,854	45	45	32	27	13	17
Antwerp, town	1,918	36	19	23	25	10	8
Antwerp, village	1,014	17	14	17	19	8	11
Belleville, village	346	5	4	10	5	6	5
Black River, village	969	17	17	22	18	12	12
Brownville, town	1,426	17	14	10	16	3	3
Brownville, village	865	7	5	13	16	21	32
Cape Vincent, town	1,566	12	6	28	34	16	6
Cape Vincent, village	1,231	31	19	10	11	2	11
Carthage, village	3,404	42	41	45	38	54	52
Champion, town	1,291	5	7	17	17	9	13
Chaumont, village	691	3	.....	18	18	7	8
Clayton, town	2,177	38	42	38	20	17	17
Clayton, village	1,918	47	34	24	23	23	21
Dexter, village	1,031	29	26	17	13	9	9
Ellisburg, town	2,734	51	42	45	33	9	17
Ellisburg, village	310	3	5	4	3	2	1
Glen Park, village	582	5	9	11	5	1	.....
Henderson, town	1,173	17	13	13	17	1	2
Henderson, village	344	2	9	8	11	1	6
Hounsfield, town	1,443	17	16	25	14	1	4
Le Ray, town	2,684	20	23	26	27	13	15

* Part of village in Fulton county.
† Including population of village of Dolgeville in Herkimer county.

Jefferson County — Continued

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Lorraine, town	949	21	16	7	9	9	4
Lyme, town	1,407	18	24	10	18	12	1
Mannsville, village	350	4	6	7	8	4	4
Orleans, town	2,433	48	54	33	27	16	20
Pamelia, town	898	12	12	39	22	2	7
Philadelphia, town	843	16	11	21	5	6	4
Philadelphia, village	856	12	21	20	18	5	12
Rodman, town	1,144	18	28	11	12	8	7
Rutland, town	914	8	7	11	13	7	8
Sacketts Harbor, village	903	14	17	19	20	12	33
Theresa, town	1,130	27	32	15	18	5	2
Theresa, village	892	7	15	12	10	10	18
Watertown, town	1,128	15	9	14	9	3	3
Watertown, city	25,447	445	447	461	389	306	391
West Carthage, village	1,377	15	27	14	22	7	7
Wilna, town	2,462	16	21	15	25	12	18
Worth, town	728	16	18	7	4	1	2
Total	80,459	1,259	1,279	1,248	1,141	713	864

Lewis County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Constableville, village	447	7	6	6	6	8	5
Copenhagen, village	642	1	1	2	11	13	10
Croghan, town	2,983	46	46	21	35	15	11
Denmark, town	1,467	10	15	25	29	5	11
Diana, town	1,555	9	19	12	18	3	3
Greig, town	911	20	10	12	13	5	5
Harrisburgh, town	731	11	8	4	8	1	4
Harrisville, village	780	17	19	12	13	21	14
Highmarket, town	589	11	8	9	6	.....	1
Lewis, town	861	13	14	12	12	1	6
Leyden, town	925	16	10	13	13	6	5
Lowville, town	1,402	25	14	25	27	7	8
Lowville, village	2,519	44	19	49	40	52	51
Lyonsdale, town	1,082	18	21	9	11	2	2
Lyons Falls, village	709	13	13	7	6	2	7
Martinsburgh, town	1,749	33	23	29	30	6	11
Montague, town	616	10	4	12	5	2	......
New Bremen, town	1,764	29	43	37	21	6	13
Osceola, town	513	10	1	5	3	.....	......
Pinckney, town	846	6	6	10	15	8	2
Port Leyden, village	717	3	10	8	11	6	33
Turin, town	745	11	13	12	12	.....	4
Turin, village	389	4	7	6	4	.....	3
Watson, town	890	6	7	17	9	4	2
West Turin, town	807	11	13	9	13	16	9
Total	26,643	384	350	363	371	189	220

Livingston County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Avon, town	1,356	14	16	7	23	3	1
Avon, village	1,782	34	37	36	30	23	18
Caledonia, town	1,009	14	14	12	18	4	8
Caledonia, village	1,221	26	13	10	10	9	7
Conesus, town	1,069	5	11	11	22	.....	......
Dansville, village	3,908	56	52	52	65	35	36
Geneseo, town	1,093	14	18	28	22	5	12
Geneseo, village	2,245	33	33	25	29	15	26
Groveland, town	1,462	27	24	19	13	10	8
Leicester, town	1,414	27	14	14	20	15	4
Lima, town	1,290	23	16	19	18	3	1
Lima, village	972	15	10	18	15	7	3
Livonia, town	1,962	61	48	27	28	15	16
Livonia, village	782	13	9	6	7	10	3
Mount Morris, town	1,337	20	26	11	14	11	5
Mount Morris, village	2,611	25	25	46	19	30	32
North Dansville, town	374	5	4	3	7	.....	......
Nunda, town	1,274	22	15	23	14	14	17
Nunda, village	1,000	15	18	21	13	11	11
Ossian, town	802	2	8	6	7	.....	4
Portage, town	1,002	14	13	17	15	3	4
Sparta, town	1,015	10	12	12	12	6	2
Springwater, town	1,861	30	42	26	34	13	8
West Sparta, town	807	13	5	13	12	3	6
York, town	2,790	50	45	35	41	18	8
Total	36,450	568	528	497	508	263	240

Madison County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Brookfield, town	2,003	33	35	38	36	9	14
Brookfield, village	434	2	3	11	11	.....	8
Canastota, village	3,244	82	67	65	69	47	46
Cazenovia, town	1,801	20	24	26	28	11	14
Cazenovia, village	1,756	37	9	34	35	19	19
Chittenango, village	639	16	10	17	12	8	5
DeRuyter, town	704	11	12	12	10	6	10
DeRuyter, village	597	6	4	20	19	12	8
Earlville, village	*765	12	11	10	17	4	11
Eaton, town	1,909	24	16	53	46	14	8
Fenner, town	822	14	17	11	16	4	4
Georgetown, town	896	19	14	14	16	12	7
Hamilton, town	†2,092	22	21	27	24	8	3
Hamilton, village	1,522	25	25	20	26	19	20
Lebanon, town	1,099	22	13	12	13	4	4
Lenox, town	1,765	16	21	20	22	5	4
Lincoln, town	1,000	12	17	16	8	6	6
Madison, town	1,664	29	31	29	27	10	13
Madison, village	313	8	4	7	6	5	6
Morrisville, village	565	7	3	19	18	5	5
Nelson, town	1,136	22	14	18	12	4	2
Oneida, city	8,420	168	162	132	131	89	77
Smithfield, town	829	15	15	13	19	11	7
Stockbridge, town	1,576	27	22	24	21	12	7
Sullivan, town	2,894	55	45	41	47	8	11
Total	39,690	704	615	689	689	332	319

* Part of village in Chenango county.
† Including population of village of Earlville in Madison county but not village of Hamilton.

Monroe County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Brighton, town	3,125	42	32	40	32	5	5
Brighton, village*	....	.....	2	.....	.....	.....	2
Brockport, village	3,627	43	63	57	54	39	26
Charlotte, village	1,834	33	22	29	28	22	25
Chili, town	2,024	29	28	24	26	6	12
Churchville, village	645	8	6	15	8	7	10
Clarkson, town	1,567	29	16	19	15	9	6
Fairport, village	2,598	48	12	32	38	40	19
Gates, town	3,739	42	46	46	43	6	9
Greece, town	4,408	57	75	91	54	21	12
Hamlin, town	2,171	47	39	24	38	16	16
Henrietta, town	1,959	38	23	36	18	6	7
Hilton, village	568	11	10	8	7	12	2
Honeoye Falls, village	1,208	17	10	21	12	4	9
Irondequoit, town	3,160	45	55	43	46	9	10
Mendon, town	1,724	23	22	13	24	16	6
Ogden, town	1,858	30	38	38	38	5	8
Parma, town	2,237	33	45	19	36	7	13
Penfield, town	3,139	69	49	34	35	14	10
Perinton, town	2,758	67	35	39	30	13	7
Pittsford, town	1,625	32	18	23	15	12	18
Pittsford, village	1,056	19	16	21	17	22	15
Riga, town	1,362	26	32	15	28	8	3
Rochester, city	181,666	3,800	3,573	2,783	2,717	2,029	1,984
Rush, town	1,415	10	2	8	16	8	5
Spencerport, village	753	5	14	8	16	10	7
Sweden, town	1,289	13	23	18	15	7	1
Webster, town	3,570	83	42	46	56	18	33
Webster, village	850	3	.....	.....	.....	2	......
Wheatland, town	2,321	57	54	31	35	11	24
Total	239,434	4,759	4,402	3,581	3,497	2,384	2,304

*Annexed to the city of Rochester.

Montgomery County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Amsterdam, town	1,850	15	17	32	21	14	3
Amsterdam, city	23,943	561	471	422	367	217	199
Canajoharie, town	1,758	23	20	19	17	11	29
Canajoharie, village	2,224	32	28	31	32	21	32
Charleston, town	932	20	9	12	10	4	4
Florida, town	2,012	13	8	25	21	5	6
Fonda, village	1,131	22	22	22	28	15	15
Fort Plain, village	2,596	35	32	28	42	34	40
Fultonville, village	912	9	10	11	17	6	5
Glen, town	1,279	20	12	14	15	5	5
Hagaman, village	815	18	11	15	9	6	8
Minden, town	1,995	17	19	27	28	6	12
Mohawk, town	1,476	10	13	19	35	3	8
Nelliston, village	709	8	12	12	11	2	5
Palatine, town	1,383	28	24	24	19	2	8
Palatine Bridge, village	318	6	3	6	5	.....	2
Root, town	1,607	19	24	28	13	8	9
St. Johnsville, town	801	8	3	9	13	5	1
St. Johnsville, village	2,172	48	36	38	30	28	27
Total	49,928	912	774	794	733	392	418

Nassau County

	Population.	Births. 1906.	Births. 1905.	Deaths. 1906.	Deaths. 1905.	Marriages. 1906.	Marriages. 1905.
East Rockaway, village	877	15	.....	11	.....	7	.....
Farmingdale, village	1,234	27	10	22	7	12	2
Freeport, village	4,012	29	24	67	14	30	10
Hempstead, town	21,564	466	45	329	47	145	28
Hempstead, village	4,145	71	419	53	263	36	161
Lawrence, village	1,500	13	75	4	52	7	42
North Hempstead, town	14,163	278	.....	245	1	74	1
Oyster Bay, town	17,561	262	265	259	209	81	61
Rockville Center, village	2,648	50	276	37	237	31	74
Sea Cliff, village	1,750	24	37	18	33	15	21
Total	69,477	1,235	1,151	1,045	863	438	400

New York (Greater)

	Population.	Births. 1906.	Births. 1905.	Deaths. 1906.	Deaths. 1905.	Marriages. 1906.	Marriages. 1905.
City of New York:							
Borough of Manhattan	2,174,335	63,006	60,197	39,831	39,671	32,342	28,406
Borough of the Bronx	290,097	7,306	6,659	6,277	5,528	2,027	1,820
Borough of Brooklyn	1,404,569	34,538	30,972	25,024	23,935	11,966	10,778
Borough of Queens	209,685	5,050	4,355	3,583	3,191	1,420	1,092
Borough of Richmond	74,174	1,873	1,692	1,488	1,389	600	573
Total	4,152,860	111,773	103,875	76,203	73,714	48,355	42,669

Niagara County

	Population.	Births. 1906.	Births. 1905.	Deaths. 1906.	Deaths. 1905.	Marriages. 1906.	Marriages. 1905.
Cambria, town	1,782	15	22	18	21	17	17
Hartland, town	2,652	90	44	41	39	16	24
La Salle, village	1,023	24	23	14	17	4	3
Lewiston, town	2,317	41	48	31	39	13	4
Lewiston, village	716	9	10	12	8	11	3
Lockport, town	2,371	32	76	67	8	13	33
Lockport, city	17,552	339	305	243	264	156	159
Middleport, village	1,358	16	49	16	38	10	13
Newfane, town	3,707	70	68	43	41	26	22
Niagara, town	339	4	6	2	5	1	1
Niagara Falls, city	26,560	567	542	431	424	601	557
North Tonawanda, city	10,157	270	255	140	145	122	111
Pendleton, town	1,263	12	16	8	6	10	4
Porter, town	1,632	46	29	18	34	5	8
Royalton, town	3,339	67	92	39	46	22	17
Somerset, town	2,069	38	59	23	24	16	8
Wheatfield, town	1,855	27	28	29	20	13	19
Wilson, town	2,342	34	32	32	26	11	6
Wilson, village	651	1	2	13	10	5	7
Youngstown, village	570	8	14	8	9	5	8
Total	84,744	1,710	1,720	1,228	1,224	1,077	1,024

Oneida County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Annsville, town	1,621	26	23	28	28	10	8
Augusta, town	1,219	7	5	15	10	6	10
Ava, town	609	13	3	4	4	.....	5
Boonville, town	1,433	28	23	26	24	4	11
Boonville, village	1,734	25	20	25	30	17	24
Bridgewater, town	700	14	10	7	10	9	2
Bridgewater, village	261	6	1	8	2	3	7
Camden, town	1,330	30	67	23	28	7	4
Camden, village	2,420	36	41	32	37	22	25
Clayville, village	357	6	11	8	7	1	4
Clinton, village	1,315	2	4	21	29	12	12
Deerfield, town	1,615	21	17	18	18	2	13
Florence, town	1,086	6	5	14	9	4	3
Floyd, town	739	11	11	7	6	1	2
Forestport, town	768	9	13	9	7	6	2
Forestport, village	689	7	15	5	7	2	5
Holland Patent, village	320	4	5	6	10	6	3
Kirkland, town	3,228	31	26	56	47	9	20
Lee, town	1,485	32	20	15	23	6	5
Marcy, town	1,385	11	15	20	20	5	7
Marshall, town	1,762	21	13	16	19	7	6
New Hartford, town	4,420	80	64	59	39	10	9
New Hartford, village	1,043	14	30	18	31	31	19
Oneida Castle, village	357	4	3	4	2	4	6
Oriskany Falls, village	813	8	11	10	8	11	11
Paris, town	2,073	34	29	30	41	21	7
Prospect, village	330	2	6	3	9	2	5
Remsen, town	660	2	5	5	3	4	1
Remsen, village	399	1	3	5	13	3	6
Rome, city	16,562	409	297	338	325	123	127
Sangerfield, town	736	26	18	17	16	3	2
Steuben, town	788	17	14	9	9	2	2
Sylvan Beach, village	*	.....	2	4	3	2	1
Trenton, town	1,595	46	27	23	23	2	6
Trenton, village	317	9	4	7	11	5	2
Utica, city	62,934	1,350	1,380	1,228	1,057	449	420
Vernon, town	2,285	27	29	31	36	7	8
Vernon, village	430	3	6	6	4	3	3
Verona, town	3,636	41	51	42	63	19	26
Vienna, town	1,958	11	7	27	29	11	10
Waterville, village	1,510	9	19	29	17	12	12
Western, town	1,442	24	19	14	29	6	4
Westmoreland, town	2,067	23	13	38	23	7	9
Whitesboro, village	2,018	22	26	29	22	45	40
Whitestown, town	4,353	115	97	75	65	19	21
Yorkville, village	524	7	9	6	13	2	1
Total	139,341	2,630	2,517	2,420	2,266	942	936

* Included in town of Vienna.

Onondaga County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Baldwinsville, village	2,961	28	26	40	36	38	42
Camillus, town	1,880	29	27	29	25	7	6
Camillus, village	706	12	15	11	11	4	10
Cicero, town	2,451	47	35	28	36	25	28
Clay, town	2,410	42	33	27	32	13	7
De Witt, town	2,718	28	27	40	39	31	24
East Syracuse, village	2,996	70	83	27	25	10	15
Eastwood, village	538	15	5	2	1	.....	......
Elbridge, town	1,507	31	28	22	25	3	3
Elbridge, village	569	9	9	9	12	1	4
Fabius, town	1,199	25	23	17	20	12	7
Fabius, village	346	3	2	3	9	7	1
Fayetteville, village	1,380	29	18	29	22	22	18
Geddes, town	794	14	5	15	14	4	2
Jordan, village	965	8	13	20	13	6	11
La Fayette, town	1,489	26	22	24	26	4	3
Liverpool, village	1,144	22	25	13	18	8	9
Lysander, town	1,418	20	41	33	44	9	9
Manlius, town	3,205	66	45	55	45	12	12
Manlius, village	1,236	26	27	22	22	10	14
Marcellus, town	2,073	37	34	21	27	4	7
Marcellus, village	671	8	15	6	10	7	6
Onondaga, town	5,324	51	61	124	142	21	28
Otisco, town	1,131	18	24	14	21	6	2
Pompey, town	2,381	29	33	44	31	3	9
Salina, town	2,682	23	17	25	24	14	12
Skaneateles, town	2,677	50	46	32	40	5	6
Skaneateles, village	1,584	18	27	19	25	17	17
Solvay, village	4,196	116	91	56	56	20	14
Spafford, town	1,130	24	23	25	15	2	6
Syracuse, city	117,503	2,028	2,094	1,846	1,819	861	862
Tully, town	863	12	9	13	13	2	1
Tully, village	600	6	6	13	12	13	7
Van Buren, town	3,147	32	27	21	24	12	7
Total	178,441	3,002	3,016	2,725	2,734	1,213	1,209

Ontario County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Bristol, town	1,268	23	33	15	20	8	6
Canadice, town	577	17	9	12	5	1	3
Canandaigua, town	2,236	32	40	21	35	1	1
Canandaigua, village	7,332	130	133	156	150	106	112
Clifton Springs, village	1,586	27	21	42	44	15	25
East Bloomfield, town	1,979	22	18	23	24	5	12
Farmington, town	1,611	43	17	19	21	1	5
Geneva, town	1,080	21	21	17	13	3	6
Geneva, city	12,249	214	288	203	167	129	94
Gorham, town	2,222	33	34	31	27	18	9
Hopewell, town	1,470	21	20	31	24	5	5
Manchester, town	1,482	38	23	40	23	9	6
Manchester, village	784	21	30	12	6	3	......
Naples, town	1,252	19	23	18	15	6	5
Naples, village	1,098	15	8	14	10	8	9
Phelps, town	3,405	38	73	24	49	8	8
Phelps, village	1,352	19	26	22	20	13	18
Richmond, town	1,380	24	24	20	17	6	8
Seneca, town	2,717	47	37	35	29	12	18
Shortsville, village	957	18	23	8	20	8	8
South Bristol, town	1,011	17	18	12	11	1	1
Victor, town	1,581	38	49	12	31	8	19
Victor, village	806	14	8	9	6	14	11
West Bloomfield, town	1,244	16	24	12	19	7	4
Total	52,689	907	1,000	808	786	395	393

Orange County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Blooming Grove, town.....	1,435	13	5	22	18	10	2
Chester, town............	923	29	33	17	31	8	13
Chester, village..........	1,205	19	7	15	4	18	2
Cornwall, town...........	2,915	55	37	25	32	19	19
Cornwall, village.........	1,945	39	50	41	41	11	12
Crawford, town..........	1,626	26	20	16	28	14	16
Deerpark, town..........	1,867	14	24	22	29	8	11
Goshen, town............	1,924	18	18	53	62	4	......
Goshen, village...........	3,099	29	31	58	69	39	31
Greenville, town..........	672	7	6	10	16	7	2
Hamptonburgh, town.....	1,158	25	16	23	21	7	6
Highlands, town.........	3,561	127	90	59	60	23	41
Middletown, city.........	14,516	236	218	240	253	175	161
Minisink, town..........	1,023	27	13	20	11	2	7
Monroe, town............	1,030	11	7	11	22	7	3
Monroe, village..........	1,008	21	22	16	15	13	15
Montgomery, town.......	1,954	37	28	35	44	10	5
Montgomery, village......	961	13	15	16	14	18	9
Mount Hope, town.......	1,128	19	21	28	20	6	9
Newburgh, town.........	4,785	14	12	42	70	7	21
Newburgh, city..........	26,498	520	496	526	504	291	235
New Windsor, town.......	2,887	32	26	38	35	10	11
Port Jervis, village.......	9,695	182	154	176	179	135	134
Tuxedo, town............	2,865	20	11	29	30	14	11
Unionville, village........	331	7	6	8	7	2	9
Walden, village..........	3,737	77	86	53	54	33	20
Wallkill, town...........	2,736	21	30	20	23	8	9
Warwick, town..........	4,923	46	35	51	57	34	32
Warwick, village.........	1,767	17	28	23	26	21	17
Washingtonville, village...	664	4	1	11	14	10	7
Waywayanda, town.......	1,574	18	17	21	15	3	9
Woodbury, town.........	1,822	31	21	41	34	13	7
Total..............	108,267	1,754	1,584	1,766	1,838	980	886

Orleans County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Albion, town.............	1,225	29	25	40	38	10	4
Albion, village...........	5,174	101	82	68	68	48	45
Barre, town..............	1,809	39	30	14	20	11	7
Carlton, town............	2,236	34	49	27	17	16	4
Clarendon, town..........	1,455	23	31	17	19	3	6
Gaines, town.............	1,839	35	33	24	19	9	17
Holley, village...........	1,506	31	38	19	28	14	20
Kendall, town............	1,638	35	40	35	32	10	10
Lyndonville, village.......	512	9	14	9	5	7	18
Medina, village..........	5,114	84	80	84	65	40	43
Murray, town............	2,425	58	74	20	25	21	11
Ridgeway, town..........	1,016	20	41	24	30	11	13
Shelby, town.............	3,900	33	24	22	28	6	11
Yates, town..............	1,449	19	27	22	23	2	5
Total..............	31,323	550	588	425	417	208	214

Oswego County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Albion, town	1,262	14	16	21	18	2	4
Altmar, village	373	7	8	3	10	8	3
Amboy, town	771	7	11	9	8	4	5
Boylston, town	743	10	11	7	11	2	2
Central Square, village	334	9	7	9	9	15	11
Cleveland, village	753	17	4	7	6	3	4
Constantia, town	1,542	17	12	22	22	10	10
Fulton, city	8,847	205	158	141	161	71	52
Granby, town	2,038	19	21	28	30	5	5
Hannibal, town	1,883	20	54	16	33	8	5
Hannibal, village	386	5	9	3	5	12	10
Hastings, town	1,839	28	22	25	33	2	2
Lacona, village	380	6	8	9	6	1	4
Mexico, town	1,810	19	31	47	45	12	1
Mexico, village	1,269	14	13	36	25	22	14
New Haven, town	1,399	30	25	22	23	7	11
Orwell, town	1,029	34	10	10	12	7	7
Oswego, town	2,550	30	19	48	42	18	14
Oswego, city	22,572	407	391	376	406	158	145
Palermo, town	1,361	18	30	22	15	12	9
Parish, town	868	11	9	12	12	8	2
Parish, village	515	6	5	6	8	11	6
Phoenix, village	1,524	32	21	28	31	12	16
Pulaski, village	1,575	19	19	29	23	4	25
Redfield, town	792	13	16	11	14	9	9
Richland, town	2,036	39	27	24	27	7	4
Sandy Creek, town	1,103	18	19	20	17	9	3
Sandy Creek, village	734	9	14	12	11	12	19
Schroeppel, town	1,362	25	29	27	21	6	7
Scriba, town	2,246	20	21	26	28	10	13
Volney, town	2,339	22	39	26	36	9	12
West Monroe, town	914	13	13	15	10	9	4
Williamstown, town	954	10	8	12	11	11	12
Total	70,110	1,153	1,100	1,109	1,169	496	450

Otsego County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Burlington, town	1,151	24	13	17	15	6	5
Butternuts, town	1,149	28	20	22	18	.....	2
Cherry Valley, town	985	14	13	15	9	2	1
Cherry Valley, village	746	9	11	11	20	14	4
Cooperstown, village	2,446	26	36	43	41	33	31
Decatur, town	502	10	14	5	9	2	2
Edmeston, town	1,679	40	10	41	16	14	9
Exeter, town	1,033	4	8	16	25	4	4
Gilbertsville, village	469	4	1	9	5	7	7
Hartwick, town	1,817	28	42	27	18	18	12
Laurens, town	1,264	33	21	17	18	8	3
Laurens, village	236	7	6	5	3	1	3
Maryland, town	1,221	16	29	21	35	.....	2
Middlefield, town	1,869	22	13	29	32	5	9
Milford, town	1,387	20	23	25	23	13	10
Milford, village	526	13	12	7	15	7	6
Morris, town	1,019	12	12	8	22	4	10
Morris, village	561	6	2	7	21	6	3
New Lisbon, town	1,088	17	9	21	15	2	2
Oneonta, town	1,874	29	23	36	20	8	7
Oneonta, village	8,054	136	125	131	140	118	87
Otego, town	1,057	20	22	13	26	5	5
Otego, village	651	20	9	16	11	9	9
Otsego, town	2,036	28	36	38	26	6	8
Pittsfield, town	970	11	13	13	21	2	5
Plainfield, town	889	7	16	12	17	6	7

Otsego County — Continued

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Richfield, town	949	16	13	21	22	4	3
Richfield Springs, village	1,684	16	17	29	17	22	24
Roseboom, town	954	15	16	12	22	4	......
Schenevus, village	560	10	8	6	12	8	6
Springfield, town	1,604	24	16	22	23	9	6
Unadilla, town	1,369	22	23	25	15	7	7
Unadilla, village	1,142	14	12	15	17	21	9
Westford, town	912	14	21	10	19	6	7
Worcester, town	2,328	43	35	33	49	19	28
Total	48,209	758	700	778	817	400	343

Putnam County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Brewster, village	1,277	24	17	9	16	83	74
Carmel, town	2,601	33	30	30	49	13	13
Cold Spring, village	2,339	23	39	48	42	29	21
Kent, town	887	19	10	24	22	9	2
Nelsonville, village	671	4	4	9	10	1	1
Patterson, town	1,680	24	30	22	26	5	20
Philipstown, town	1,967	16	13	22	28	7	8
Putnam Valley, town	949	14	11	20	17	3	9
South East, town	1,796	39	36	28	24	4	4
Total	14,169	196	190	212	234	154	152

Rensselaer County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Berlin, town	1,623	29	22	16	17	12	16
Brunswick, town	2,714	30	37	23	39	15	13
Castleton, village	1,267	24	22	23	22	8	7
East Greenbush, town	1,321	11	7	20	13	7	9
Grafton, town	1,075	7	8	11	10	4	5
Hoosick, town	2,966	41	11	44	35	24	22
Hoosick Falls, village	5,251	106	85	82	65	86	83
Nassau, town	1,536	23	26	35	22	6	5
Nassau, village	455	4	1	12	6	10	3
North Greenbush, town	1,222	13	12	17	38	1	6
Petersburg, town	1,350	28	24	23	33	6	9
Pittstown, town	3,099	47	21	44	39	13	12
Poestenkill, town	1,143	11	10	21	24	6	9
Rensselaer, city	10,715	137	156	163	184	77	77
Sand Lake, town	2,205	30	38	25	35	24	25
Schaghticoke, town	1,102	17	10	18	26	3	6
Schaghticoke, village	1,191	26	15	18	19	3	8
Schodack, town	3,157	52	44	38	38	8	15
Stephentown, town	1,424	37	21	11	19	13	17
Troy, city	76,910	896	904	1,551	1,653	563	520
Valley Falls, village	888	10	7	9	11	5	5
Total	122,637	1,579	1,481	2,204	2,348	894	872

Rockland County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Clarkstown, town	7,021	79	56	86	75	48	28
Grand View-on-Hudson, village	356	1	1	3	3	.....	1
Haverstraw, town	1,952	14	53	7	16	16	12
Haverstraw, village	6,182	90	94	87	72	43	42
Hillburn, village	878	29	21	10	13	11	14
Nyack, village	4,441	80	48	97	74	42	33
Orangetown, town	5,030	58	46	58	66	19	24
Piermont, village	1,193	4	21	37	24	6	6
Ramapo, town	4,026	115	84	82	86	27	39
South Nyack, village	1,848	26	17	30	20	5	5
Spring Valley, village	2,583	57	41	21	17	18	13
Stony Point, town	3,862	69	84	51	62	26	19
Suffern, village	2,655	57	37	46	30	17	16
Upper Nyack, village	648	4	6	8	13	.....	......
West Haverstraw, village	2,348	62	35	24	30	4	5
Total	45,032	745	644	647	601	282	257

St. Lawrence County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Brasher, town	2,333	32	36	34	40	5	14
Canton, town	3,715	67	63	73	76	8	9
Canton, village	3,083	62	42	43	54	50	45
Clare, town	329	2	3	5	1	1	......
Clifton, town	1,717	59	39	29	23	11	13
Colton, town	2,099	41	43	36	25	10	12
De Kalb, town	2,161	46	34	25	26	6	15
De Peyster, town	952	13	19	10	3	1	7
Edwards, town	943	22	21	21	18	5	1
Edwards, village	438	14	10	9	5	6	13
Fine, town	2,371	43	40	20	25	8	13
Fowler, town	1,756	14	10	20	30	8	2
Gouverneur, town	2,353	49	39	36	21	14	11
Gouverneur, village	4,229	57	80	68	68	60	77
Hammond, town	1,484	32	36	17	18	4	9
Hammond, village	385	12	14	2	2	3	5
Hermon, town	988	9	12	9	7	6	2
Hermon, village	517	7	5	7	9	17	10
Hopkinton, town	1,509	20	27	15	15	4	9
Lawrence, town	860	25	30	22	33	15	16
Lisbon, town	3,166	12	42	30	34	15	11
Louisville, town	1,553	28	19	25	24	6	5
Macomb, town	1,245	26	19	9	19	4	4
Madrid, town	1,664	23	21	25	26	12	11
Massena, town	1,692	37	42	15	23	4	11
Massena, village	2,547	93	62	44	34	62	33
Morristown, town	1,404	29	27	11	18	3	8
Morristown, village	429	7	5	6	5	24	22
Norfolk, town	2,864	68	71	39	46	14	11
Norwood, village	1,779	51	36	29	27	32	23
Ogdensburg, city	13,179	324	298	266	250	225	144
Oswegatchie, town	2,303	14	12	32	28	7	11
Parishville, town	2,111	34	38	41	48	12	9
Piercefield, town	862	27	30	10	11	7	11
Pierrepont, town	1,641	11	25	16	18	3	2
Pitcairn, town	965	14	12	22	19	5	4
Potsdam, town	3,051	43	14	32	28	6	3
Potsdam, village	4,162	52	73	53	67	[illegible]	55
Richville, village	354	8	7	7	3	8	7
Rossie, town	1,192	13	24	22	13	9	5
Russell, town	2,036	24	33	32	28	10	7
Stockholm, town	2,711	41	39	38	39	16	19
Waddington, town	1,197	17	20	12	10	3	3
Waddington, village	708	6	10	13	15	12	7
Total	90,045	1,628	1,582	1,330	1,332	795	709

Saratoga County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Ballston, town	2,040	15	12	23	23	11	15
Ballston Spa, village	4,131	40	35	59	54	47	45
Charlton, town	971	11	14	19	14	4	4
Clifton Park, town	2,247	36	32	38	23	14	11
Corinth, town	1,086	14	16	33	19	5	4
Corinth, village	2,186	80	71	23	21	19	14
Day, town	643	11	3	13	8	1	5
Edinburg, town	924	9	8	12	11	13	7
Galway, town	1,098	19	8	15	23	6	5
Galway, village	149	.....	2	3	3	3	1
Greenfield, town	1,735	19	25	19	38	15	21
Hadley, town	776	15	10	19	14	4	6
Half Moon, town	1,868	13	12	32	25	8	10
Malta, town	1,324	8	3	22	20	9	2
Mechanicville, village	5,877	206	182	94	103	72	55
Milton, town	1,888	84	87	77	67	9	15
Moreau, town	1,094	18	13	16	14	12	1
Northumberland, town	1,255	21	37	13	22	1	5
Providence, town	538	11	9	6	10	1	3
Saratoga, town	1,715	11	9	28	26	12	2
Saratoga Springs, town	1,349	3	1	16	19	1	2
Saratoga Springs, village	12,999	292	194	274	262	133	148
Schuylerville, village	1,529	36	14	26	25	22	23
South Glens Falls, village	2,097	10	21	24	37	7	21
Stillwater, town	3,346	6	10	18	34	.....	6
Stillwater, village	923	2	6	15	17	13	6
Victory, village	735	15	11	17	11	.....	2
Waterford, town	2,876	54	65	43	52	14	24
Waterford, village	3,134	54	37	44	77	30	28
Wilton, town	1,004	16	18	15	13	7	7
Total	62,658	1,129	965	1,056	1,085	493	498

Schenectady County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Duanesburgh, town	2,467	30	26	37	35	12	10
Glenville, town	2,012	25	21	39	26	5	4
Niskayuna, town	1,445	15	16	13	15	6	4
Princetown, town	653	9	.....	6	9	3	3
Rotterdam, town	4,198	24	19	35	42	15	17
Schenectady, city	58,387	1,722	1,464	901	797	623	428
Scotia, village	2,166	50	33	27	26	18	9
Total	71,334	1,875	1,579	1,058	950	682	475

Schoharie County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Blenheim, town	701	11	13	11	10	5	6
Broome, town	1,054	7	11	17	13	5	11
Carlisle, town	1,091	13	12	21	17	5	7
Cobleskill, town	1,573	14	18	21	16	10	7
Cobleskill, village	2,158	23	25	44	54	22	25
Conesville, town	734	13	15	12	11	9	6
Esperance, town	773	5	8	6	11	4	10
Esperance, village	231	3	1	7	4	2	2
Fulton, town	1,611	28	20	21	23	7	8
Gilboa, town	1,425	21	22	22	17	5	10
Jefferson, town	1,304	20	21	28	18	8	10
Middleburgh, town	1,457	21	28	25	30	10	15
Middleburgh, village	1,209	7	7	14	11	6	7
Richmondville, town	950	10	7	13	15	.....	4
Richmondville, village	587	6	4	8	14	10	6
Schoharie, town	1,752	26	27	21	21	17	11
Schoharie, village	1,027	15	14	21	14	4	7
Seward, town	1,458	25	12	23	24	6	9
Sharon, town	1,467	24	14	22	19	2	6
Sharon Springs, village	526	9	11	11	9	6	8
Summit, town	1,146	20	17	21	18	13	10
Wright, town	1,060	12	13	17	17	4	6
Total	25,294	333	329	406	386	160	191

Schuyler County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Burdette, village	378	6	8	8	8	1	1
Catherine, town	914	14	12	14	26	6	14
Cayuta, town	383	9	6	4	5	1	1
Dix, town	952	9	9	14	22	8	7
Hector, town	3,510	62	48	52	52	24	19
Montour, town	414	2	4	6	6	1	2
Montour Falls, village	1,236	16	7	15	22	18	17
Odessa, village	354	2	.....	3	.....	2	.....
Orange, town	1,197	10	15	14	28	4	10
Reading, town	1,412	14	16	13	5	8	5
Tyrone, town	1,411	21	16	20	25	17	6
Watkins, village	2,957	48	53	44	47	51	54
Total	15,122	213	194	207	246	141	136

Seneca County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Covert, town	1,237	23	20	19	33	3	8
Fayette, town	2,718	37	29	20	37	10	11
Interlaken, village	717	5	3	9	4	5	6
Junius, town	908	16	21	9	23	3	2
Lodi, town	1,540	25	23	23	27	7	6
Ovid, town	1,444	18	9	13	18	8	3
Ovid, village	577	4	12	11	9	7	12
Romulus, town	2,017	23	38	22	29	6	10
Seneca Falls, town	811	8	4	13	3	.....	.....
Seneca Falls, village	6,733	124	123	123	105	58	61
Tyre, town	808	23	13	19	8	9	2
Varick, town	1,196	22	26	14	16	3	2
Waterloo, town	474	14	17	16	11	5	7
Waterloo, village	4,123	72	67	76	67	40	34
Total	25,315	414	405	387	390	164	164

Steuben County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Addison, town	537	11	13	8	8	54	37
Addison, village	2,027	17	18	23	23	40	44
Avoca, town	1,125	32	16	7	11	4	8
Avoca, village	1,026	12	19	17	10	13	15
Bath, town	2,794	32	56	58	48	15	13
Bath, village	3,695	55	39	55	64	54	46
Bradford, town	620	5	6	9	11	6	4
Cameron, town	1,217	25	17	13	15	4	13
Campbell, town	1,350	17	24	18	22	6	12
Canisteo, town	1,186	15	15	18	13	9	11
Canisteo, village	1,985	32	24	43	27	43	43
Caton, town	1,215	6	15	16	13	21	11
Cohocton, town	2,158	38	33	30	24	11	12
Cohocton, village	826	10	11	12	10	8	12
Corning, town	2,212	43	48	23	26	18	10
Corning, city	13,515	285	203	195	217	204	229
Dansville, town	1,270	17	20	9	19	2	2
Erwin, town	1,046	13	26	14	16	3	7
Fremont, town	914	10	14	11	6	7	8
Greenwood, town	1,082	15	21	17	8	12	5
Hammondsport, village	1,141	19	21	20	18	14	21
Hartsville, town	664	14	6	8	10	1	2
Hornby, town	940	14	25	11	10	3	3
Hornellsville, town	1,942	21	15	31	23	7	13
Hornell, city	13,259	277	238	189	202	175	183
Howard, town	1,530	19	13	24	17	8	12
Jasper, town	1,365	27	35	20	18	7	9
Lindley, town	1,174	24	17	14	17	84	93
Painted Post, village	1,061	21	13	18	13	23	27
Prattsburg, town	1,204	17	7	8	17	1	3
Prattsburg, village	694	4	8	5	12	10	11
Pulteney, town	1,384	13	22	21	15	9	9
Rathbone, town	973	8	19	9	9	4	4
Savona, village	596	4	15	7	12	5	4
Thurston, town	927	15	19	18	13	2	4
Troupsburg, town	1,725	32	30	23	23	28	39
Tuscarora, town	1,070	12	6	13	10	12	6
Urbana, town	1,376	15	21	20	12	2	8
Wayland, town	1,480	28	27	12	16	8	9
Wayland, village	1,220	20	25	15	16	19	14
Wayne, town	682	12	8	9	6	3	3
West Union, town	1,011	22	10	7	5	11	5
Wheeler, town	1,006	19	14	9	7	7	2
Woodhull, town	1,226	18	16	20	16	8	11
Woodhull, village	342	5	3	10	8	3	7
Total	81,814	1,370	1,271	1,137	1,116	988	1,044

Suffolk County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Amityville, village	2,429	11	16	65	84	10	11
Babylon, town	3,133	49	48	62	72	8	14
Babylon, village	2,357	41	49	37	28	26	18
Brookhaven, town	12,604	184	200	216	157	68	70
East Hampton, town	4,303	83	77	43	46	11	20
Greenport, village	2,667	86	108	38	48	14	23
Huntington, town	8,433	121	127	134	94	46	36
Islip, town	13,721	207	241	208	151	97	72
Northport, village	1,803	26	43	13	22	13	17
Patchogue, village	3,446	66	87	35	38	41	36
Riverhead, town	4,950	51	56	65	80	69	59
Sag Harbor, village	3,048	59	70	42	35	20	20
Shelter Island, town	1,105	14	24	14	20	4	6
Smithtown, town	3,325	70	79	46	83	21	29
Southampton, town	5,763	121	110	71	105	29	40
Southampton, village	2,213	51	57	19	24	11	14
Southold, town	6,322	89	86	55	75	25	20
Total	81,653	1,329	1,478	1,163	1,162	513	505

Sullivan County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Bethel, town	2,154	41	33	31	34	9	11
Callicoon, town	2,026	28	27	34	52	18	9
Cochecton, town	1,123	17	15	19	17	12	13
Delaware, town	1,814	37	43	34	32	35	55
Fallsburgh, town	3,810	71	74	53	72	21	11
Forestburgh, town	544	10	5	4	8	5	3
Fremont, town	2,110	45	44	23	35	12	11
Highland, town	975	33	12	18	9	16	13
Liberty, town	3,359	43	48	86	80	11	10
Liberty, village	2,124	32	36	91	76	54	40
Lumberland, town	749	9	8	7	15	3	6
Mamakating, town	2,691	35	25	36	38	15	9
Monticello, village	1,388	33	32	46	50	19	17
Neversink, town	2,009	24	13	25	9	17	8
Rockland, town	3,714	71	59	44	54	35	40
Thompson, town	2,777	26	20	34	30	10	5
Tusten, town	907	14	14	15	19	3	8
Wurtsboro, village	508	12	14	12	16	5	7
Total	34,795	581	522	612	646	300	276

Tioga County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Barton, town	1,744	18	16	27	30	6	19
Berkshire, town	919	12	12	12	15	6	4
Candor, town	2,346	27	29	33	40	9	19
Candor, village	802	10	7	22	10	12	7
Newark Valley, town	1,193	21	23	23	20	2	3
Newark, Valley, village	909	14	19	7	17	8	2
Nichols, town	1,004	10	13	18	15	5	7
Nichols, village	452	2	2	5	17	30	18
Owego, town	2,994	44	38	42	70	18	13
Owego, village	5,010	70	67	91	77	58	69
Richford, town	1,001	11	18	10	17	9	6
Spencer, town	980	27	12	16	20	6	7
Spencer, village	618	9	11	15	11	11	14
Tioga, town	2,017	33	34	36	39	13	13
Waverly, village	4,915	71	73	78	50	255	287
Total	26,907	379	374	435	448	448	481

Tompkins County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Caroline, town	1,704	15	32	25	33	10	15
Danby, town	1,246	19	20	19	17	7	8
Dryden, town	2,474	23	22	36	38	10	14
Dryden, village	749	12	9	10	14	7	8
Enfield, town	1,111	11	7	17	22	5	6
Freeville, village	493	2	6	1	12	6	4
Groton, town	2,022	23	29	43	43	6	9
Groton, village	1,188	13	19	11	20	11	11
Ithaca, town	1,573	5	13	16	15	6	2
Ithaca, city	14,615	219	201	207	209	166	148
Lansing, town	2,653	46	35	37	36	8	15
Newfield, town	1,338	13	15	16	23	5	8
Newfield, village	347	3	4	6	6	14	2
Trumansburg, village	1,202	13	11	19	32	15	15
Ulysses, town	1,428	22	17	20	21	8	5
Total	34,151	439	440	483	541	284	270

Ulster County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Denning, town	688	7	9	6	2	2	......
Ellenville, village	2,872	27	23	55	40	42	32
Esopus, town	4,205	77	80	70	57	16	21
Gardiner, town	1,473	13	53	32	34	17	9
Hardenbergh, town	657	6	13	3	3	1	2
Hurley, town	1,677	18	15	31	17	11	13
Kingston, town	439	8	15	5	8	1	1
Kingston, city	25,556	677	543	473	486	272	255
Lloyd, town	2,722	55	41	40	42	6	15
Marbletown, town	2,988	39	36	37	39	24	19
Marlborough, town	3,917	58	71	44	56	20	22
New Paltz, town	1,192	30	11	40	36	5	3
New Paltz, village	970	15	18	28	26	11	10
Olive, town	2,347	35	54	34	41	25	23
Pine Hill, village	520	4	11	5	5	10	9
Plattekill, town	1,823	34	14	25	31	8	10
Rifton, village	581	12	11	8	6	3	4
Rochester, town	2,822	37	24	34	46	19	21
Rosendale, town	3,271	67	73	45	54	11	8
Rosendale, village	1,399	21	18	29	18	17	4
Saugerties, town	5,914	123	113	97	89	21	45
Saugerties, village	3,833	67	56	55	50	24	25
Shandaken, town	2,525	56	40	42	36	23	17
Shawangunk, town	2,467	43	46	26	30	23	16
Ulster, town	3,797	17	28	66	36	16	7
Wawarsing, town	4,343	82	65	65	66	32	26
Woodstock, town	1,665	31	31	30	26	6	16
Total	86,660	1,659	1,512	1,425	1,380	666	633

Warren County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Bolton, town	1,561	17	27	17	14	6	10
Caldwell, town	845	17	13	15	15	5	6
Chester, town	1,965	20	21	44	22	17	10
Glens Falls, village	14,650	236	211	264	220	142	138
Hague, town	1,054	7	10	10	13	9	7
Horicon, town	1,114	14	12	11	10	7	10
Johnsburgh, town	2,364	33	46	41	25	23	21
Lake George, village	644	16	9	14	4	12	9
Luzerne, town	1,371	20	30	22	16	16	8
Queensbury, town	2,131	48	43	27	35	4	6
Stony Creek, town	910	20	12	8	12	7	5
Thurman, town	833	12	13	8	13	.....	1
Warrensburgh, town	2,483	37	38	36	34	23	29
Total	31,935	497	485	517	433	271	260

Washington County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Argyle, town	1,575	23	27	36	28	16	12
Argyle, village	246	1	4	3	5	3	4
Cambridge, town	246	19	12	26	22	3	14
Cambridge, village	1,604	12	19	23	31	21	29
Dresden, town	620	6	5	9	9	2	5
Easton, town	2,210	351	26	17	28	7	5
Fort Ann, town	1,812	31	35	27	33	7	8
Fort Ann, village	438	3	4	5	10	10	6
Fort Edward, town	1,494	46	48	39	23	14	13
Fort Edward, village	3,806	57	68	58	67	34	36
Granville, town	2,623	37	58	34	58	23	37
Granville, village	3,864	62	61	57	50	99	33
Greenwich, town	2,342	29	22	35	43	3	8
Greenwich, village	1,996	28	31	33	41	26	26
Hampton, town	671	13	7	13	10	15	17
Hartford, town	1,270	14	14	21	24	5	7
Hebron, town	1,599	9	18	32	28	5	11
Jackson, town	1,052	13	12	12	20	2	2
Kingsbury, town	1,713	35	25	30	23	3	14
Putnam, town	507	7	2	3	7	3	2
Salem, town	1,489	17	20	31	33	22	21
Salem, village	1,313	12	12	20	25	10	9
Sandy Hill, village	5,321	185	82	65	65	77	37
White Creek, town	2,425	9	15	16	15	17	21
Whitehall, town	980	23	39	10	20	26	39
Whitehall, village	4,148	109	76	76	80	67	21
Total	47,376	1,151	742	731	798	520	437

Wayne County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Arcadia, town	2,556	24	42	24	40	22	2
Butler, town	1,704	18	25	19	33	12	9
Clyde, village	2,552	47	39	54	50	28	70
Galen, town	1,908	24	18	24	16	5	3
Huron, town	1,592	24	24	21	29	8	11
Lyons, town	909	33	49	35	35	.....	3
Lyons, village	4,758	66	60	89	75	48	50
Macedon, town	1,938	39	28	27	29	8	15
Macedon, village	677	10	5	6	10	5	3
Marion, town	2,025	32	30	38	35	15	17
Newark, village	4,554	82	67	78	65	49	36
Ontario, town	2,604	44	65	35	50	16	10
Palmyra, town	1,946	15	38	27	38	7	4
Palmyra, village	2,096	40	20	33	47	29	29
Red Creek, village	499	2	1	7	9	10	5
Rose, town	1,888	31	35	29	29	8	20
Savannah, town	1,138	21	22	16	24	5	10
Savannah, village	544	8	3	6	7	6	6
Sodus, town	4,997	60	65	73	90	36	41
Walworth, town	2,156	37	29	28	28	10	17
Williamson, town	2,912	49	54	49	47	34	19
Wolcott, town	1,312	32	5	23	10	9	1
Wolcott, village	1,294	14	23	15	23	16	23
Total	48,564	752	747	756	819	386	404

Westchester County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Ardsley, village	470	10	10	2	9	2	......
Bedford, town	4,759	59	55	78	81	22	23
Briarcliff Manor, village	417	16	13	3	3	5	5
Bronxville, village	994	10	13	17	12	8	3
Cortlandt, town	6,230	107	115	81	86	24	43
Croton-on-Hudson, village	1,599	47	43	28	30	17	11
Dobbs Ferry, village	3,515	81	65	66	50	16	25
Eastchester, town	1,412	21	28	27	14	9	7
Greenburgh, town	3,740	41	33	46	43	14	4
Harrison, town	2,922	52	32	54	48	8	13
Hastings-on-Hudson, vil'ge	3,060	63	59	55	45	13	21
Irvington, village	2,480	45	36	27	21	19	15
Larchmont, village	1,760	16	14	13	8	9	3
Lewisboro, town	1,542	19	22	22	25	15	11
Mamaroneck, town	*5,653	7	4	18	8	1	1
Mamaroneck, village	5,090	84	89	80	101	59	29
Mt. Kisco, village	1,830	25	34	38	27	19	28
Mount Pleasant, town	3,393	45	42	129	166	8	11
Mount Vernon, city	25,006	603	576	402	331	769	453
New Castle, town	1,126	27	37	29	19	8	5
New Rochelle, city	20,480	448	554	346	285	209	172
North Castle, town	1,483	25	10	17	16	6	10
North Pelham, village	850	11	9	12	9	.....	2
North Salem, town	1,169	9	23	21	12	14	15
North Tarrytown, village	4,750	42	77	78	72	39	32
Ossining, town	2,764	25	55	26	25	3	3
Ossining, village	7,135	165	137	159	139	68	46
Peekskill, village	13,200	246	219	248	236	107	92
Pelham, town	†1,841	2	6	3	3	.....	2
Pelham, village	349	5	2	7	1	.....	......
Pelham Manor, village	638	2	5	4	10	3	3
Pleasantville, village	1,585	22	30	20	16	18	19
Port Chester, village	11,198	170	138	180	165	312	231
Poundridge, town	798	4	7	18	12	9	13
Rye, town	2,803	6	5	6	1	4	......
Rye, village	4,076	61	53	46	51	40	25

*Includes population of villages of Mamaroneck and Larchmont.
†Includes population of villages of Pelham and North Pelham.

Westchester County — Continued

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Scarsdale, town	1,018	17	22	11	17	1	......
Somers, town	1,175	16	14	24	18	10	3
Tarrytown, village	5,370	50	46	74	77	36	20
Tuckahoe, village	1,580	67	46	28	24	2	3
White Plains, town	550	2	.....	8	1	.....	......
White Plains, village	11,579	262	257	215	193	136	114
Yonkers, city	61,716	1,554	1,412	1,095	1,020	691	617
Yorktown, town	2,294	41	41	37	38	13	12
Total	228,950	4,630	4,488	3,898	3,568	2,766	2,145

Wyoming County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Arcade, town	887	9	6	9	13	4	8
Arcade, village	1,052	14	15	12	15	12	13
Attica, town	905	11	22	14	15	1	6
Attica, village	1,816	32	21	32	32	27	26
Bennington, town	1,861	21	37	31	22	12	10
Castile, town	1,386	12	6	10	18	1	5
Castile, village	1,000	8	7	22	15	13	16
Covington, town	957	4	8	17	12	5	3
Eagle, town	1,152	19	16	21	15	6	9
Gainesville, town	1,412	24	24	16	20	3	11
Gainesville, village	309	4	1	4	3	.....	2
Genesee Falls, town	633	3	5	13	13	14	10
Java, town	1,663	18	18	25	30	12	13
Middlebury, town	1,378	15	7	16	14	13	21
Orangeville, town	890	12	14	23	17	4	3
Perry, town	1,160	29	26	26	23	10	8
Perry, village	3,749	71	44	41	36	48	43
Pike, town	774	13	10	10	15	1	2
Pike, village	457	5	13	15	9	2	5
Sheldon, town	1,742	38	30	20	23	19	13
Silver Springs, village	817	13	26	11	8	8	5
Warsaw, town	1,273	17	20	10	18	2	9
Warsaw, village	3,196	48	45	47	40	35	33
Wethersfield, town	869	18	10	11	10	7	5
Total	31,355	458	431	456	436	259	279

Yates County

	Population.	Births.		Deaths.		Marriages.	
		1906.	1905.	1906.	1905.	1906.	1905.
Barrington, town	1,119	1	4	5	10	4	5
Benton, town	2,137	22	18	26	25	5	8
Dresden, village	321	2	5	4	3	7	4
Dundee, village	1,282	20	4	12	24	12	21
Italy, town	897	14	10	8	7	4	4
Jerusalem, town	2,554	15	31	38	37	10	13
Middlesex, town	1,202	20	34	21	18	3	6
Milo, town	1,579	22	22	12	25	5	8
Penn Yan, village	4,504	34	63	90	73	57	50
Potter, town	*1,568	24	25	14	20	8	11
Rushville, village	†500	7	12	13	5	5	9
Starkey, town	1,560	7	19	11	29	3	3
Torrey, town	680	18	9	10	6	1	2
Total	19,408	206	256	264	282	124	144

* Part of village in Ontario county.

† Including population of village of Rushville in county of Yates.

Incomplete Registration

It will be noticed that the registration of births in many localities is not complete, and while correspondence with the local registrars during the year has resulted in some of the local boards of health taking an active interest in bringing about a more complete registration of births and marriages, many boards fail to take any decided action to compel physicians and clergymen to comply with the provisions of section 22 of the Public Health Law.

During the year it was necessary for the Department to serve notices upon eleven local boards failing to file their monthly reports regularly, threatening to take charge of the registration unless the boards complied with the provisions of section 22 of the Public Health Law.

In only one instance was it found necessary to send a representative to take charge of the registration — village of Clayville, Oneida county.

Letters were written from time to time to 124 local boards where the registration was known to be incomplete, and near the close of the year a circular letter was mailed to each of the local registrars requesting them to at once obtain all outstanding certificates and forward them to this Department.

While this resulted in many delayed certificates being received at the close of the year, it is evident that no lasting improvement will result in this line of the work of the Department unless personal representatives are kept on the road visiting the local boards of health and instructing them as to their duty and the proper manner in which they should proceed to bring about more complete registration of vital statistics.

Defective Certificates

A large number of certificates that come to the Department from local registrars of vital statistics are defective. In many instances the defect consists of an omission, but we receive many death certificates in which the stated cause of death is unclassifiable in any known system of classification. It is hard to obtain correction of these latter certificates. The physician often refuses to amend in any way what he has written, and there is no way of

compelling him to do so. The remedy must be applied before the certificate reaches this Department. The local registrar must be instructed to refuse to accept certificates in which the stated cause of death is unsatisfactory to the Department. But it is hardly fair to adopt a standard to which physicians are to conform without acquainting them with the standard.

With the assistance of the Division of Publicity and Education this has been accomplished. The December, 1906, issue of the *Monthly Bulletin* of the Department contained a list of defective causes, the use of which by physicians would lead to the rejection of the certificate by the local registrar. A copy of this issue of the *Monthly Bulletin* was mailed to every physician in the State outside of Greater New York, where the matter is properly looked after by the city department of health, and we look for more perfect returns as the result.

A copy of the *Bulletin* was also sent to each coroner, for coroners are among the chief offenders in this particular. Certificates bearing such stated causes of death as "Disease of the throat resulting in choking to death," "Natural causes," "Congenital deformity" (in a man aged 63 years), have been accepted by local registrars and transferred to this Department. The office of coroner is a quasi-medical one, and it is the duty of the coroner to familiarize himself more or less with medical terminology and causes of death as recognized by the medical profession and vital statisticians.

During the year 2,055 defective certificates were returned for correction.

Transcripts

Requests for certified copies of certificates on file in this Department to be used for judicial and administrative purposes were received as follows: Births, 195; marriages, 118; and deaths, 253; total, 566.

Condition of the Work

The condition of the work in the Division of Vital Statistics at the close of the year was much more satisfactory than at the close of 1905.

If the work of the Division is to be kept up it is essential that

some provisions be made to provide additional clerical help, as the recent reorganization of the Division of Contagious Diseases now requires the services of clerks who had been able to devote their time to index work in the Division of Vital Statistics.

Recommendations

That the Commissioner of Health may have the necessary information at hand in order to properly "*investigate the source of mortality, and the effect of localities, employment and other conditions upon the public health,*" as required by the provisions of section 4 of the Public Health Law, it is highly important that the original death certificates, or true copies thereof, be on file in the State Department of Health.

In compiling the statistics of the State to carry out the above provisions of the Public Health Law it is necessary to know the sex and age of deceased, nativity, employment, duration of disease, cause of death, contributing cause, sanitary surroundings, etc.; and that this work may be done with certainty, accuracy and uniformity, the individual certificates giving full information should be filed with the Department.

Over one-half of the births, marriages and deaths occurring in the State are recorded at the central office in the city of Greater New York, and to avoid the confusion of reference in years to come, for the sake of uniformity and for the sake of security (which is provided by the State Department of Health to protect these records from loss by fire or otherwise), all certificates of births, marriages and deaths occurring in the State outside of Greater New York should be filed at one place — the central office in the Capitol at Albany.

There is no reason for excepting Albany, Buffalo and Yonkers from a rule applicable and acted upon by Rochester, Syracuse and the other large cities and municipalities of the State. Like the rest of the State, these cities can preserve a local registry of births, marriages and deaths.

No apparent advantage comes to them from maintaining separate filing places, while it is a distinct disadvantage to the State Department of Health and to all who have occasion to refer to original records.

As to the "*effect of employments* and other conditions upon the public health," the Department has never tabulated the information given on the death certificates or made any special investigation to show the effect of different employments upon the public health or their relation to the cause of death.

Under present conditions, any work in this line would have to be confined to the certificates filed with the Department, which would leave the cities of Albany, Buffalo, Greater New York and Yonkers out of the question, and no satisfactory results would be obtained from partial returns of the vital statistics of the State.

I would, therefore, respectfully recommend that you again urge upon the Legislature the necessity of the Public Health Law being amended so as to provide that all certificates of births, marriages and deaths occurring in the State outside of Greater New York be filed with the State Department of Health.

It would then be possible for the Department to tabulate the information given on the death certificates as outlined above, and from the birth certificates might be obtained the total number of males and females born in the State, those born of native and foreign-born parents, number born out of wedlock, etc.

As the enactment of a marriage license law would not only correct a social evil, but would also result in the complete registration of marriages occurring in the State, the Department is justified in advocating the passage of the bill introduced in the Legislature by Senator Cobb.

To ensure more satisfactory returns of vital statistics from the local registration districts, the health officer should be designated by law as the registrar of vital statistics, especially in the towns and villages, as it seems almost impossible to prevail upon the town and village clerks to take an active interest in procuring returns of births, marriages and deaths occurring in their registration district, and defective certificates are received by them without question.

The local health officer is an appointee of the State Commissioner of Health, and he is interested in the work of the Department and would take pride in seeing that the registration of vital statistics in his town or village was made as complete as possible,

and all certificates properly filled out before forwarding them to the Department.

In conclusion, I would respectfully call your attention to the necessity of the Legislature providing funds for extra clerical services, and a liberal appropriation for providing the Division with additional steel filing cases to properly care for the records filed with the Department.

Respectfully submitted,

F. D. BEAGLE,
Director Division of Vital Statistics

February 1, 1907.

SUMMARY OF MORTALITY REPORTED DURING THE YEAR

SUMMARY OF MORTALITY REPORTED DURING THE YEAR

The mortality of January was smaller than in 1905, both actually and relatively, with a death rate of 17.2 against 18.5. Among epidemic diseases, cerebro-spinal meningitis and scarlet fever were diminished; typhoid fever, measles, diphtheria were increased in mortality. Pneumonia, which had a high death rate last January, was moderately increased, but local diseases which have no infectious quality were diminished in mortality. The age relationships were unaffected. Indeed, there were no striking variations between the two months, those mentioned being moderate.

In February the mortality increased from 382 deaths daily to 400 and a death rate of 18.0. Infancy mortality increased; cerebro-spinal meningitis, measles and diphtheria continued to increase, and likewise consumption; but pneumonia had decreased, both months having had about sixty deaths daily. As in the comparison between the two January months, infectious diseases were unaffected, and local diseases were moderately increased.

Pneumonia caused 15 per cent. of the total mortality, and 100 fewer deaths than in last February, with a similar decrease from January. All sections of the State showed about equal decrease. The usual grippe epidemic was in progress, but less than 100 deaths were in any way attributed to it.

The average mortality for March during the past five years exceeded that of any other month of the period; it had been due to the unprecedented number of deaths in this month in both 1904 and 1905, when there were many more than in July, always heretofore first in this. This year 12,854 deaths were 300 less than in March, 1905, and 1,500 less than in 1904, equaling, however, the latter in pneumonia mortality. There was a moderate increase in scarlet fever and whooping-cough. Consumption had a large death rate, but March is always its month of greatest fatality.

The mortality for the month of April decreased moderately from March, the deaths being 500 fewer in number, but the aver-

age daily mortality was 411 against 415, at which rate the difference is reduced to about 100. The mortality of March represented an annual mortality per 1,000 population of 18.6, while that of April is 18.5. In the distribution of this moderate variation the chief decrease was in the maritime district and especially in the city of New York, where there was a saving of seven deaths a day for the month, so that its death rate was materially lowered. In the other sanitary districts there was but little change from the March mortality, in the Lake Ontario and Western district there being an increase, while in the central part of the State the death rate was lowered.

Pneumonia caused 1,900 deaths in April, 63 deaths a day, to 61 in January, 60 in February and 66 in March. It exceeded the mortality from any other cause. Consumption caused 10 per cent. of the deaths of the month, and pneumonia 15 per cent. The epidemic diseases altogether caused hardly 10 per cent. of the deaths, and all deaths from diseases of the circulatory system and all those from diseases of the nervous system, respectively, caused in the neighborhood of 10 per cent. of the total mortality. During the three earlier months of the year pneumonia caused between 15 and 16 per cent. of the deaths from all causes. It is the cause of the great winter and spring death rate of recent years.

These deaths were not, however, evenly distributed. In the four months of the year, of 26,600 deaths in the city of New York more than 5,000, or almost one-fifth of the deaths, were from pneumonia. In all of the rest of the State there were 2,340 deaths from pneumonia, which were less than 11 per cent. of the total mortality, hardly more than half the number relatively that occurred in the city.

During May typhoid fever and malarial diseases had a slightly lower death rate than for the previous year, and also a considerably lower one than the average rate for the past five years. There were 69 deaths from typhoid fever in May as compared with 87 for the corresponding period in 1905, while the average for the past five years was 99. Malarial diseases furnished a similar comparison: 9 deaths this year, 11 last year, and 15 for the average of the past five years.

During the month there were 1,228 deaths from pulmonary tuberculosis as against 1,288 in May, 1905, and an average for

the past five years, 1,234. The annual death rate per 1,000 population was only a fraction of a per cent. higher than last year or the average for the past five years.

Conspicuous among the diseases that had a higher mortality for May, 1906, than for 1905, and had a higher average for the past five years, were the following: Measles: 1906, 205; 1905, 152; average past five years, 122. Diphtheria and croup: 1906, 278; 1905, 193; average past five years, 246. (The larger portion of the increase was in New York city.) Erysipelas: 1906, 65; 1905, 62; average past five years, 47. Cancer: 1906, 512; 1905, 465; average past five years, 468. Pneumonia: 1906, 1,451; 1905, 1,236; average past five years, 1,032. Bright's disease: 1906, 812; 1905, 726; average past five years, 538. And external causes: 1906, 764; 1905, 674; average past five years, 642.

With the exception of the increases in the infant mortality and in the acute infectious diseases, measles, diphtheria and erysipelas, these increases were to be expected as the general course is toward an increase in the diseases of middle life and the aged, and a decrease in diseases of childhood and early manhood.

In June the total number of deaths was somewhat higher than the average for the past five years and somewhat lower than the corresponding period in 1905, the respective figures being 9,937, 9,846 and 10,000.

Scarlatina showed a slight increase over the deaths last year, while diphtheria and croup were decidedly below the average for the past five years, the respective figures being 173 and 230.

The deaths from sporadic cerebro-spinal meningitis were far below the average for the past five years and those of 1905, the respective numbers being 28, 113 and 210. Pulmonary tuberculosis, cancer, diseases of the nervous system, diseases of the circulatory system, pneumonia, other diseases of the digestive system and Bright's disease were on the increase, while unclassified general diseases were far below the average for five years and the number for 1905, the respective numbers being 492, 1,677 and 1,487.

While tetanus is not included in the *Bulletin* classification, there were reported to the Department during the month seven deaths from this disease from different parts of the State. The usual causes were given as a rusty nail in the foot, injury to back of hand, wounds, etc.

All these cases could have been prevented by the injection of the person injured, at the time the wound was dressed, with a prophylactic dose of tetanus antitoxin. This antitoxin is distributed freely to all health officers, and is, therefore, available in all parts of the State.

For the month of July a review of the vital statistics of the State disclosed the following facts:

The total number of deaths was slightly increased over the average for the past five years, but a still further comparison showed that the figures were somewhat lower than for the corresponding period in 1905, the figures being respectively 11,931, 11,840 and 12,810. The deaths under one year of age for the month showed a decrease of 538 from July, 1905, while those from one to five showed a decrease of 205 deaths in the same period.

There were 97 deaths from typhoid as compared with 186 for July, 1905, and 116 as an average for the past five years.

It will be noted that there were 83 deaths from cerebro-spinal meningitis reported as against 133 for the month of July, 1905.

There were 86 deaths from measles in July against 88 for the same month last year; 93 from whooping-cough against 104; scarlatina, 34 against 32; diphtheria and croup, 150 against 147; pulmonary tuberculosis shows 1,107 deaths for the month, average for the past five years 1,067, and for July, 1905, 1,090. The figures for cancer for the same period are 523, 463 and 526, showing a slight decrease this year from last year's report.

The death rate for August, 1906, exceeded that for the same month last year and also went beyond the average for the past five years. Under 1 year of age there were about 400 more deaths than in August, 1905, but the greatest increase was found in deaths at 60 years and over, there being a large increase this year. The increase in the deaths from Bright's disease and from other diseases of the genito-urinary system accounted for part of this. There was an increase of 191 deaths from external causes. Two hundred and five more deaths from diarrhea and enteritis under 2 years were recorded. There was a slight decrease in the deaths from cancer and from pulmonary tuberculosis, although the figures in each case exceeded those representing the average for the past five years. Of epidemic diseases, there died from typhoid, 158;

malaria, 11; measles, 37; scarlatina, 20; whooping-cough, 89; diphtheria and croup, 104. It was gratifying to see a decrease in the deaths from typhoid; 158 this year, 189 last year, and an average for the past five years of 161. Fulton, with an annual death rate of 8.1 per 1,000 of population, enjoyed the distinction of being the healthiest community. Ogdensburg had the highest annual death rate, 31.0, having a high mortality under 1 year of age.

For the month of September the mortality was higher than that of the corresponding month last year and than the average for the past five years, the excess in 1906 being roughly 1,500, or 1 per thousand of population. This increased mortality was distributed as follows: There were 530 more deaths under 1 year of age, 45 more deaths from typhoid, 50 more deaths from cancer, an increase of 80 from diseases of the circulatory system; an added mortality of 120 from pneumonia, with 60 more from other diseases of the respiratory system; nearly 400 more deaths from diarrhea and enteritis under 2 years, about 70 added from genito-urinary diseases and 25 more deaths from external causes. These figures are approximate. Eighteen deaths from malaria were reported against 9 last year. It is probable that some of these should go to swell the typhoid mortality. There was a gratifying drop of 11 in the deaths from scarlet fever. Whooping-cough and diphtheria, cerebro-spinal meningitis, epidemic and sporadic, were less prevalent than a year ago, the deaths being 17 fewer; but there were 10 more than the average for the past five years. There were 59 fewer deaths from pulmonary tuberculosis, but the total was 10 above the average.

During the month of October typhoid fever added considerably to the death list. New York city reported 31 more deaths from this cause than in October, 1905. The annual death rate from all diseases per 1,000 of population in Greater New York advanced from 16.0 in October, 1905, to 16.9 in 1906. A noticeable increase was found in the mortality from malaria, whooping-cough, pneumonia and infantile diarrhea. The communities showing an annual death rate above 20 per 1,000 during the month were Cohoes, Troy, Watervliet, Kingston, Poughkeepsie, Ogdensburg, Amsterdam, Rome and Lockport. Of these Kingston stood at the head with 23.0 per 1,000. On the

other hand, Middletown, Johnstown, Jamestown and Tonawanda showed a death rate of less than 10 per 1,000, Middletown being the lowest with 8.3. Typhoid fever, diphtheria, pneumonia, cancer and diseases of the circulatory and digestive systems added considerably to the mortality of the month.

For November the annual death rate for the whole State per 1,000 of population was 0.1 less than the corresponding month for the five years immediately preceding. The highest annual death rate per 1,000 of population occurred in Ogdensburg, 27.3; other cities showing an annual death rate per 1,000 of population of more than 20 are Watertown, 20.7; Newburgh, 20.8; Olean, 21.3; Troy, 23.1. In contrast to this Jamestown showed the lowest annual death rate — 8.7. Among other healthy cities were Tonawanda, North Tonawanda and Cortland, each showing an annual death rate per 1,000 of population of 10.6; Little Falls and Geneva, each with a rate of 10.8; and Lockport showing 10.9.

For December the mortality tables showed a lessened death roll from the principal epidemic diseases as compared with the average of the past five years. Deaths from typhoid dropped from an average of 157, and a total of 165 in December, 1905, to 136. Deaths from measles and scarlet fever were 19 and 20 respectively below the average for five years, and diphtheria was the cause of 34 less deaths during the month than it had been on the average for the past five years. On the other hand, whooping-cough caused 19 more deaths than it did in December, 1905, the figures for which month were also those of the average for the past five years. Influenza caused 70 deaths, and there were 1,219 deaths from diseases of the nervous system as against 1,136 in December, 1905, and a five years' average of 1,172. Pneumonia showed a mortality of 1,643, an increase of 115 over last year, and of 317 over the five years' average. Bright's disease and cancer had each increased mortalities to their credit, and there were 128 more deaths from external causes than a year ago and 206 more than the five years' average. The highest annual death rate per 1,000 of population, in cities of over 20,000 population, was shown by Cohoes, where the figure was 26.8, the lowest among the same cities, 10.0, by Jamestown. Among the smaller cities, Little Falls showed the highest annual death rate per 1,000 of population, viz., 23.7; and Johnstown the lowest, 6.1.

SUMMARY OF MORTALITY OF THE STATE OF NEW YORK FOR THE YEAR 1906, AS PUBLISHED IN THE MONTHLY BULLETIN.

TOTAL MORTALITY BY MONTHS.

1906.	Population State Census of 1905.	Total deaths.	Rate per 1,000 of population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DISEASES. Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.	Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.
January	....	11,838	17.2	1,881	1,012	2,200	120	8	....	127	75	58	280	....	53	....	94
February	....	11,351	18.0	1,926	1,054	1,990	106	2	1	177	58	54	300	....	53	....	106
March	....	12,854	18.6	1,973	1,316	2,300	84	7	....	243	75	68	314	....	48	....	153
April	....	12,360	18.5	2,041	1,257	2,121	79	7	1	248	93	74	263	....	52	....	176
May	....	12,072	17.7	1,863	1,252	2,866	69	9	2	205	135	58	278	26	65	2	184
June	....	9,937	14.5	1,836	940	2,839	71	13	3	128	65	69	173	22	40	72	28
July	....	11,932	17.5	3,266	1,075	2,735	97	17	....	86	34	93	150	6	23	60	23
August	....	12,456	18.2	3,612	1,061	2,905	158	11	....	37	20	89	104	5	22	36	24
September	....	11,565	16.9	3,010	924	2,754	222	18	....	22	23	74	126	9	13	41	18
October	....	11,364	16.6	2,252	786	3,090	232	20	....	17	20	75	195	16	17	....	55
November	....	10,539	15.4	1,673	717	2,961	194	12	....	31	29	46	239	28	32	40	14
December	....	12,075	17.7	1,781	782	3,973	136	15	....	48	63	63	269	70	34	6	46
Totals for the year	8,198,500	140,343	17.1	27,114	12,176	32,734	1,568	139	7	1,369	690	821	2,691	182	452	257	921
Average for past five years	....	131,530	17.4	......	§35,377	*22,703	1,586	172	190	933	1,124	745	2,851	....	374	....	†1,135
Totals for 1905	7,735,000	137,059	17.4	25,827	12,218	23,783	1,554	106	9	988	726	847	2,296	....	415	....	†2,566

* 70 years and over. § All deaths under 5 years. † All deaths from cerebrospinal meningitis.

SUMMARY OF MORTALITY OF THE STATE OF NEW YORK FOR THE YEAR 1906—(*Concluded*).

1906.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis, (under 2 years.)	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
January	1,183	493	1,592	1,244	1,283	1,884	407	188	643	786	149	122	....	....	....	....	465	584	....
February	1,198	487	1,550	1,128	1,228	1,693	439	158	606	758	144	108	....	....	....	....	440	548	....
March	1,387	494	1,682	1,233	1,398	2,044	446	214	699	826	166	141	....	....	....	....	496	636	....
April	1,349	527	1,618	1,186	1,380	1,887	418	226	618	792	160	113	....	....	....	....	446	647	....
May	1,228	512	1,252	1,195	1,329	1,451	403	226	653	812	214	120	26	8	7	386	394	764	59
June	1,141	500	492	1,098	1,143	868	343	441	686	635	218	95	41	15	71	319	277	781	89
July	1,107	523	696	981	1,218	573	268	1,821	927	693	211	115	48	16	63	659	265	969	190
August	1,074	526	710	975	1,135	520	240	2,339	928	703	234	106	49	13	62	711	367	963	295
September	997	526	746	1,005	1,148	651	249	1,693	821	684	205	98	57	16	82	704	283	760	274
October	1,090	548	624	1,167	1,308	931	393	828	820	727	204	87	46	11	54	655	316	721	187
November	1,094	528	547	1,089	1,243	1,187	472	262	621	696	219	101	53	15	93	571	278	719	86
December	1,179	504	576	1,220	1,582	1,644	585	182	719	872	236	120	59	11	65	601	305	782	83
Totals for the year	14,027	6,168	12,094	13,521	15,395	15,333	4,663	8,578	8,741	8,984	2,360	1,326	379	105	497	4,606	4,332	8,874	1,263
Average for past five years	13,552	5,446	17,913	13,411	13,451	......	‡18,175	¶8,483	7,603	8,276	2,227	1,172	....	....	....	....	5,039	7,960	....
Totals for 1905	14,061	6,056	19,025	13,569	14,547	14,157	3,675	8,955	8,158	8,869	1,828	1,377	....	....	....	....	4,923	8,352	....

‡ All respiratory diseases. ¶ Includes all ages.

TOTALS OF MORTALITY IN THE SANITARY DISTRICTS FOR THE YEAR 1906.*

SANITARY DISTRICTS.	Total deaths.	Rate per 1,000 of population.	AGES.			EPIDEMIC DISEASES.										
			Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Typhoid fever.	Malarial diseases.	Small pox.	Measles.	Scarlatina.	Whooping Cough.	Diphtheria and croup.	Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.
Maritime	82,544	18.2	18,346	9,081	12,371	689	85	6	1,184	513	434	1,971	74	313	236	610
Hudson Valley	12,026	17.0	1,685	699	3,849	184	26	......	56	17	76	162	17	27	4	64
Adirondack and Northern	6,161	15.1	925	326	2,325	115	6	......	19	12	36	67	24	22	......	31
Mohawk Valley	7,230	16.3	1,223	408	2,620	88	4	1	10	50	54	106	10	25	......	43
Southern Tier	6,443	14.7	863	274	2,694	124	7	......	4	9	52	61	16	16	......	25
East Central	6,373	15.4	853	271	2,604	59	1	......	19	26	56	44	14	10	......	23
West Central	4,917	15.6	568	154	2,292	62	4	......	13	9	23	27	14	7	......	18
Lake Ontario and Western	14,649	15.5	2,653	961	4,081	247	6	......	64	54	90	253	13	32	17	107

TOTALS OF MORTALITY IN THE SANITARY DISTRICTS FOR THE YEAR 1906—(*Concluded*).

SANITARY DISTRICTS.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis, under 2 years.	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
Maritime	9,540	3,288	7,594	6,162	7,789	11,381	2,239	6,135	4,324	5,904	1,189	824	187	78	370	2,341	1,084	5,214	786
Hudson Valley	1,126	580	876	1,524	1,495	954	560	422	916	756	210	81	34	3	21	438	523	702	172
Adirondack and Northern	550	278	506	782	791	458	207	209	466	280	100	56	19	3	16	301	409	346	52
Mohawk Valley	523	310	501	924	893	556	290	322	598	426	143	62	33	5	16	331	399	441	66
Southern Tier	395	331	505	874	935	389	242	241	508	356	145	49	31	4	15	249	430	383	47
East Central	491	343	482	831	938	393	249	229	464	340	149	34	24	2	16	267	438	388	41
West Central	315	276	372	729	752	320	160	179	399	217	101	38	23	2	10	155	357	313	22
Lake Ontario and Western	1,086	763	1,258	1,695	1,800	882	716	841	1,067	705	322	182	28	8	33	524	692	1,087	77

*THE SANITARY DISTRICTS into which the State is divided are as follows: *Maritime District:* Includes Greater New York, Long Island (Nassau and Suffolk counties) and Westchester county. *Hudson Valley District:* All the counties on either side of the Hudson river except Westchester, to and including Albany and Rensselaer. *Adirondack and Northern District:* The northern section of the State—the counties of Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis. *Mohawk Valley District:* Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties. *Southern Tier District:* The seven counties along the southern border of the State. *East Central District:* Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties. *West Central District:* Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties. *Lake Ontario and Western District:* Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

RELATIVE AREA, DENSITY OF POPULATION AND DEATH RATES IN THE SANITARY DISTRICTS FOR 1906.

DISTRICTS.	Area in square miles (land.)	Population per square mile.	Urban death rate.	Rural death rate.	Total death rate.	Percentage of Deaths.			
						Under 1 year of age.	Between 1 and 5 years of age.	At 60 years of age and over.	From epidemic diseases.
Maritime	1,946	2,324	18.3	17.0	18.2	22.2	11.0	14.9	14.7
Hudson Valley	5,679	124	18.4	15.7	17.0	14.0	5.8	31.8	8.6
Adirondack and Northern	13,358	31	17.5	14.7	15.1	15.0	5.2	37.7	8.3
Mohawk Valley	5,179	86	16.0	16.5	16.3	16.9	5.6	36.2	9.7
Southern Tier	6,419	68	14.4	14.8	14.7	13.3	4.2	41.8	8.4
East Central	6,252	66	15.5	15.3	15.4	13.3	4.2	40.8	7.3
West Central	4,588	69	18.2	15.4	15.6	11.5	3.1	46.6	6.9
Lake Ontario and Western	4,199	226	15.9	14.3	15.5	18.1	6.5	27.8	11.6
Entire State	47,620	172	17.8	15.4	17.1	19.3	8.7	23.3	12.4

RELATIVE AREA, DENSITY OF POPULATION AND DEATH RATES IN THE SANITARY DISTRICTS FOR 1906 —(*Concluded*).

DISTRICTS.	IN EACH 1,000 DEATHS FROM ALL CAUSES THERE WERE FROM—						
	Typhoid fever.	Scarlet fever.	Diphtheria and croup.	Diarrheal diseases.	Consumption.	Pneumonia.	Bright's disease.
Maritime	8	6	21	74	115	137	71
Hudson Valley	15	1	13	35	93	79	62
Adirondack and Northern	18	2	11	34	89	74	45
Mohawk Valley	12	7	14	45	72	77	59
Southern Tier	19	1	9	37	61	60	55
East Central	9	4	7	35	77	61	53
West Central	13	2	5	36	64	65	44
Lake Ontario and Western	17	4	17	57	74	60	48
Entire State	11	5	19	61	100	109	64

MORTALITY OF THE STATE OF NEW YORK FOR THE YEAR 1906, AS PUBLISHED IN THE MONTHLY BULLETINS

CHANGES IN CLASSIFICATION

In order to bring the tabulation of the statistics of the Department into greater uniformity with the Bertillon or International System of Classification, some few changes were made during the past year in the tables published in the *Monthly Bulletin*. The change was made in the May number. Old age as a cause of death was restricted to persons over 60 years of age. Deaths from influenza and erysipelas were given separate columns under the heading of epidemic diseases. A separate column was set apart for diarrhea and enteritis under 2 years, diseases of the skin, diseases of the organs of locomotion, malformations, early infancy (under 3 months), external causes and ill-defined diseases. Some slight changes were also made in the order of the columns.

VITAL STATISTICS FOR

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns in

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	Ages. Deaths under 1 year of age.	Ages. Deaths 1 to 5 years of age.	Ages. Deaths at 70 years and over.	Epidemic. Cerebro-spinal meningitis.	Epidemic. Typhoid fever.	Epidemic. Malarial diseases.	Epidemic. Smallpox.
MARITIME DISTRICT.										
City of New York	4,152,860	6,518	18.4	1,218	772	695	75	28	3	....
BOROUGH OF MANHATTAN	2,174,335	3,373	18.2	696	336	334	49	10	2	....
BOROUGH OF THE BRONX	290,097	532	21.3	72	74	50	1	3	....	....
BOROUGH OF BROOKLYN	1,404,569	2,269	19.0	400	343	251	23	13	1	....
BOROUGH OF QUEENS	209,685	226	13.0	37	13	32	1	2	....	....
BOROUGH OF RICHMOND	74,173	118	19.0	13	6	28	1	....	....	....
Oyster Bay	20,545	42	24.0	8	2	11	....	....	....	....
Hempstead	34,746	50	17.0	9	2	12	....	2	....	....
North Hempstead	14,163	11	....	2	1	0	....	....	....	....
Southold	8,989	11	....	0	1	7	....	....	....	....
Sag Harbor	3,048	1	....	1	0	0	....	....	....	....
Huntington	10,236	5	....	1	0	4	....	....	....	....
Brookhaven	16,050	29	....	2	0	13	....	....	....	....
YONKERS	61,716	77	15.0	17	9	10	....	1	....	....
Greenburgh	18,635	21	....	2	2	2	....	....	....	....
MOUNT VERNON	25,006	31	14.6	3	4	4	....	1	....	....
Port Chester	11,200	13	....	4	0	1	....	1	....	....
Ossining	7,135	9	....	0	1	3	....	....	....	....
NEW ROCHELLE	20,480	14	10.0	4	1	4	....	....	....	....
Peekskill	13,200	22	....	3	3	5	....	....	....	....
White Plains	11,579	17	....	1	0	4	....	....	....	....
Mamaroneck	5,090	3	....	0	0	1	....	1	....	....
Rest of District	98,262	139	14.2	13	0	37	....	....	....	....
Totals for the District	4,523,940	7,013	18.2	1,288	798	813	75	34	3	....
Totals for January, 1905	4,273,767	7,178	19.8	1,247	803	840	130	52	4	....
HUDSON VALLEY DISTRICT.										
ALBANY	100,000	145	17.3	13	12	25	....	2	....	....
COHOES	24,183	48	23.5	10	2	8	....	3	....	....
TROY	76,910	132	19.8	16	5	24	....	2	....	....
WATERVLIET	14,600	19	....	2	0	4	....	....	....	....
Green Island	4,878	5	....	1	0	0	....	1	....	....
Hoosick Falls	5,251	10	....	4	0	1	....	1	....	....
RENSSELAER	10,715	11	12.0	4	1	1	....	....	....	....
Coxsackie	4,317	5	....	0	0	2	....	....	....	....
Catskill	5,294	11	....	1	0	3	....	1	....	....
HUDSON	10,290	17	20.0	1	0	9	....	1	....	....
KINGSTON	25,556	38	17.5	5	0	7	....	....	....	....
Ellenville	2,872	6	....	0	0	4	....	....	....	....
Marbletown	3,000	5	....	0	0	2	....	....	....	....
Rosendale	4,670	5	....	0	1	1	....	....	....	....
Esopus	4,786	5	....	2	0	0	....	....	....	....
Saugerties	3,833	2	....	1	0	1	....	....	....	....
POUGHKEEPSIE	25,379	46	21.3	7	2	11	....	....	....	....
Fishkill	13,183	20	....	5	1	3	....	....	....	....
Wappingers Falls	3,588	3	....	1	0	1	....	....	....	....
NEWBURG	26,500	45	20.0	3	2	10	....	1	....	....
Port Jervis	9,700	16	....	2	0	1	....	....	....	....
MIDDLETOWN	14,516	15	13.0	1	0	5	....	1	....	....
Warwick	6,690	5	....	0	0	2	....	....	....	....
Goshen	5,023	8	....	0	1	0	....	1	....	....
Montgomery	6,652	10	....	0	0	6	....	2	1	....
Haverstraw	10,482	33	....	3	3	2	....	....	2	....
Nyack	4,441	12	....	2	1	3	....	....	....	....
Ramapo	10,142	20	....	4	2	4	....	....	....	....
Rest of District	264,000	343	15.5	31	12	129	3	6	....	....
Totals for the District	705,500	1,040	17.4	119	45	299	3	22	3	....
Totals for January, 1905	696,000	1,127	19.0	133	50	293	8	16	....	....

JANUARY, 1906 — VOLUME XXII.

man type; **Populations estimated to date printed in full faced figures.**

DISEASES.					OTHER CAUSES OF DEATH.													
Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal) under 5 years.	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified
116	35	19	213	127	731	1,292	197	69	286	485	82	621	493	249	322	68	299	658
40	21	10	56	61	386	671	96	39	163	252	35	304	251	137	194	22	179	377
11	1	...	50	14	122	78	16	3	17	29	8	43	28	19	21	3	28	34
59	11	9	99	45	183	469	76	23	93	177	37	226	181	81	92	33	82	228
4	...	...	4	3	26	50	5	1	10	18	2	29	24	7	14	5	7	13
2	2	...	4	4	14	24	4	3	3	9	...	19	9	5	1	5	3	6
1	...	4	...	1	3	3	1	1	3	4	...	5	6	...	1	4	1	4
...	...	...	2	1	6	5	3	...	2	1	...	7	6	1	4	5	2	3
...	1	...	...	...	1	1	...	...	1	...	...	2	1	...	2	...	...	2
...	...	...	1	...	...	...	...	...	1	3	...	1	2	...	1	2	...	...
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...	...	1	...	...	2	...	1	...	2	3	...	2	4	1	2	8	2	1
...	...	...	...	1	6	16	3	...	4	6	...	2	7	4	4	2	10	10
...	...	...	2	...	3	2	3	1	2	...	1	...	2	...	2	...	3	...
...	...	...	1	1	2	4	1	...	...	3	...	8	3	3	1	1	2	...
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...	...	...	...	...	...	...	1	...	1	3	...	1	4	...	1	1	...	2
...	...	...	...	...	...	2	3	1	1	3	...	4	4	1	1	...	...	2
1	...	...	...	...	...	3	3	...	1	...	...	3	1	...	1	1	2	1
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...	...	1	1	1	19	19	13	1	2	10	1	16	25	4	6	5	6	9
118	36	25	222	132	775	1,351	232	73	306	522	85	675	562	264	348	100	327	696
33	28	23	208	151	784	1,363	224	67	310	525	122	636	632	264	339	100	355	752
			1	...	11	19	7	...	10	17	...	20	20	14	4	5	6	9
...	...	1	1	3	7	3	6	...	8	5	...	3	2	1	1	1	1	2
...	1	...	...	1	21	18	5	1	7	14	...	15	9	6	6	3	7	15
...	...	...	...	...	2	5	2	...	...	1	...	3	3	...	...	1	...	2
...	...	...	...	...	1	1	1	...	...	...	...	...	...	...	1	...	...	...
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...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...
...	...	1	...	...	4	6	4	2	2	1	...	4	7	2	4	5	...	4
...	...	...	1	...	2	2	...	...	1	1	...	3	5	...	1	...	1	3
...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	1	...	5	5	1	...	6	...	2	11	3	...	4	1	2	3
...	...	1	...	...	...	2	...	...	1	...	...	5	2	1	2	1	1	...
...	...	...	1	...	1	2	...	...	...	...	...	2	4	1	...	1	1	1
...	...	...	...	...	...	...	...	...	1	...	...	...	2	1	...	1	...	...
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...	...	...	...	...	...	...	1	...	...	1	1	...	2	...	...	2	...	...
...	...	...	...	...	3	1	...	...	...	1	...	3	1	2	17	1	...	2
...	...	...	...	...	1	1	...	...	1	2	...	2	1	1	...	...	...	2
...	...	1	...	1	2	...	3	...	...	...	...	4	3	...	2	1	3	1
...	1	1	1	4	31	58	15	3	23	16	5	36	56	14	14	26	8	21
...	3	5	6	10	[illegible]	137	51	7	67	65	8	128	137	49	62	58	35	76
[illegible]	[illegible]	[illegible]	11	7	117	132	68	5	83	64	9	153	151	46	44	72	48	74

VITAL STATISTICS FO

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDE[MIC] Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.
ADIRONDACK AND NORTHERN DISTRICT.									
WATERTOWN	25,447	25	12.0	3	0	4	....	1	....
Ellisburgh	3,740	4	....	0	0	0	....	....	....
Carthage	3,404	2	....	1	0	1	....	....	....
Clayton	4,100	4	....	0	0	1	....	....	....
OGDENSBURGH	13,179	24	23.0	3	2	3	....	....	....
Gouverneur	6,582	9	....	2	0	3	....	....	....
Potsdam	4,162	6	....	1	0	1	....	....	....
Canton	6,800	14	....	1	0	6	....	....	....
Malone	6,478	7	....	2	1	2	....	....	....
PLATTSBURG	10,184	8	10.0	2	2	2	....	....	....
Glens Falls	14,650	31	24.0	6	0	8	2	....	....
Whitehall	4,148	6	....	0	0	0	....	2	....
Fort Edward	5,300	7	....	0	0	2	....	....	....
Sandy Hill	5,321	3	....	0	0	2	....	....	....
Granville	6,487	4	....	0	0	2	....	1	....
Greenwich	4,338	9	....	0	2	2	....	....	....
Lowville	3,921	5	....	1	0	1	....	....	....
Rest of District	279,800	309	13.5	56	16	95	1	7	....
Totals for the District	408,100	477	14.0	78	23	135	3	11	....
Totals for January, 1905	400,000	447	13.5	59	25	147	2	6	....
MOHAWK VALLEY DISTRICT.									
SCHENECTADY	58,387	77	15.5	17	3	13	1	2	....
Cobleskill	3,731	5	....	0	0	1	....	....	....
AMSTERDAM	23,943	41	20.0	14	1	7	....	....	....
Fort Plain	2,600	1	....	0	0	1	....	....	....
JOHNSTOWN	9,845	12	....	3	2	2	....	....	....
GLOVERSVILLE	18,672	23	15.0	2	2	6	....	....	....
LITTLE FALLS	11,122	9	....	1	0	2	....	....	....
Herkimer	6,600	9	....	0	0	6	....	....	....
Ilion	5,924	5	....	0	0	2	....	....	....
UTICA	62,934	100	18.7	19	9	23	....	....	....
Whitestown	6,895	10	....	2	0	5	....	....	....
ROME	16,562	25	17.5	1	0	6	1	....	....
Boonville	3,167	5	....	0	0	4	....	....	....
Camden	3,750	5	....	0	0	4	....	....	....
Waterford	6,000	7	....	1	3	1	....	....	....
Mechanicville	5,877	6	....	2	0	0	....	....	....
Ballston Spa	4,131	4	....	0	0	2	....	....	....
Saratoga Springs	13,000	24	22.0	4	1	5	....	....	....
Rest of District	181,600	246	16.0	18	10	108	3	4	....
Totals for the District	444,740	614	16.4	84	31	198	5	6	....
Totals for January, 1905	433,640	563	16.5	77	25	173	2	5	....
SOUTHERN TIER DISTRICT.									
BINGHAMTON	42,036	62	17.4	7	2	15	....	....	....
Owego	5,010	5	....	1	0	1	....	....	....
Candor	3,148	11	....	2	0	4	....	....	....
Waverly	4,915	5	....	0	0	2	....	....	....
ELMIRA	34,687	38	13.0	4	2	15	....	1	....
Horseheads	4,826	6	....	1	1	0	....	....	....
HORNELLSVILLE	13,259	21	20.0	4	0	4	....	....	....
Bath	3,700	4	....	0	0	3	....	....	....

JANUARY, 1906 — (*Continued*).

Diseases.						Other Causes of Death.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal) under 5 years.	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
						1	2		1	1	1		3	9	1	2		1	2
													1	2				1	
										1									1
						2							1			1			
			1		1	5	2	1		1	2		1	1		4	3	1	1
			1							2				2	2		1	1	
						1					1	1	1	1	1				
							2			1			2	2	2		2	3	
				1			2						1			2			1
				1		1							1		2		1		2
						2	8	2		3	1		5	3		1	2		2
						1					1					1		1	
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						1						1	1						
						1	3	1		1				2		1			
											1					1	1	1	1
	5	1		3	2	30	30	11	4	21	10	2	31	45	16	11	33	7	39
	5	1	2	5	3	46	50	15	5	31	18	4	50	70	25	25	43	16	49
1		2	5	1	8	40	49	37	2	26	19	4	70	48	21	17	49	13	27
				4		7	11	2	1	10	3	1	6	8		4	2	3	12
						1							1	2			1		
			2		1	4	6	3		1	1		2	5	1	2	3	1	9
							1												
				1			2			1	1		2	1		1			3
1		1				1		3			4		3	6		1	1	1	1
						2	1				1	1	3						1
							1			1	1		2				2	2	
1									1				1	1	1				
2			1	1		7	11	2	2	11	4		12	14	4	5	7	6	11
							2			3	1		2				1		1
						2	2			3			4	5	2	1	2		3
							1			1				1			1	1	
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						1							1	3					2
					1	1	1							1		1		1	
							1						1				1	1	
1						3	2	1	1	2	2		1	3		1	1	3	3
6		1		2	2	13	30	6		14	21	3	36	50	9	7	21	6	12
12		2	3	8	4	42	72	17	5	48	40	5	77	101	17	23	44	25	58
6	2			6	8	45	55	28	1	37	46	5	70	76	30	29	46	16	50
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						1				1		1		1		1			
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							1										3		

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEM[IC] Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.
SOUTHERN TIER DISTRICT—(*Con.*)									
CORNING	13,515	17	15.0	1	1	4	....	....	....
Wellsville	4,355	8	....	2	1	2	....	....	....
OLEAN	10,163	7	....	0	2	2	....	....	....
Salamanca	5,455	10	....	1	0	2	....	....	....
DUNKIRK	15,250	18	14.5	4	1	5	....	2	....
JAMESTOWN	26,160	21	10.0	2	1	3	....	1	....
Westfield	2,823	4	....	0	0	2	....	....	....
Fredonia	5,148	7	....	1	0	5	....	....	....
Rest of District	244,500	318	15.5	24	12	116	1	7	....
Totals for the District	439,000	562	15.0	64	23	185	1	11	....
Totals for January, 1905	435,000	549	15.0	62	18	189	1	4	....
EAST CENTRAL DISTRICT.									
SYRACUSE	117,500	165	16.5	8	8	37	1	2	....
Baldwinsville	2,961	6	....	0	0	3	....	....	....
DeWitt	6,252	7	....	0	0	1	....	....	....
CORTLAND	11,272	15	15.6	1	0	2	....	....	....
Homer	2,536	6	....	1	0	3	....	....	....
ONEIDA	8,420	11	15.5	0	0	3	....	....	....
Hamilton	3,614	7	....	0	0	3	....	1	....
Cazenovia	3,557	4	....	0	1	1	....	....	....
Canastota	3,244	3	....	1	1	0	....	....	....
Norwich	7,115	16	....	2	1	7	....	....	....
Oneonta	8,054	10	14.7	0	0	1	....	....	....
Worcester	2,328	5	....	0	0	2	....	....	....
Cooperstown	2,446	4	....	0	0	1	....	....	....
Walton	5,000	3	....	0	0	0	....	....	....
Sidney	4,319	1	....	0	0	0	....	....	....
Liberty	5,483	14	....	1	1	2	....	....	....
Rest of District	220,100	279	15.0	28	3	116	....	3	....
Totals for the District	414,200	551	15.6	42	15	182	1	6	....
Totals for January, 1905	414,500	501	14.0	59	23	167	2	4	....
WEST CENTRAL DISTRICT.									
AUBURN	31,422	43	16.0	3	2	11	....	....	....
ITHACA	14,615	19	16.0	2	1	9	....	....	....
Hector	3,888	7	....	0	1	2	....	....	....
Waterloo	4,123	3	....	0	0	1	....	....	....
Seneca Falls	6,733	11	....	3	1	2	....	....	....
GENEVA	12,249	18	17.7	2	1	4	....	....	....
Canandaigua	7,332	14	....	3	2	2	....	1	....
Manchester	4,800	5	....	1	0	2	....	....	....
Phelps	4,757	3	....	0	0	3	....	....	....
Penn Yan	4,504	13	....	1	0	5	....	....	....
Batavia	10,080	9	11.0	2	0	3	....	....	....
Dansville	3,908	5	....	1	0	3	....	....	....
Le Roy	3,400	5	....	0	0	3	....	....	....
Warsaw	4,469	6	....	0	0	3	....	....	....
Rest of District	199,400	235	14.0	11	3	102	....	4	1
Totals for the District	315,700	396	15.0	29	11	155	....	5	1
Totals for January, 1905	320,600	380	14.0	27	13	157	....	6	....

JANUARY, 1906 — (*Continued*).

DISEASES.						OTHER CAUSES OF DEATH.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal) under 5 years.	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
...	...	...	...	1	...	2	1	...	...	1	...	...	3	5	...	2	...	1	1
...	...	...	...	1	...	...	3	1	...	...	1	...	1	...	...	...	...	...	1
...	...	...	...	...	1	...	...	...	...	...	...	...	1	1	...	4	...	...	...
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...	...	...	...	1	...	1	1	...	...	3	...	...	2	1	...	1	2	1	3
...	...	...	...	...	1	5	3	2	...	...	1	...	2	3	...	1	...	1	1
...	...	...	...	...	...	...	...	...	...	...	1	...	2	...	...	...	1	...	...
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...	...	2	4	1	2	15	31	17	3	25	18	6	46	46	16	12	33	12	21
1	..	2	4	6	4	35	60	25	6	44	33	8	82	79	21	30	49	20	41
...	..	2	...	8	3	34	46	25	3	42	28	16	86	82	23	22	52	17	55
1	..	...	1	1	...	12	18	6	...	12	7	4	20	16	12	11	12	8	21
...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	...	...	...	...	...
...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...
...	...	...	...	1	...	3	1	...	1	...	2	...	2	2	...	2	...	...	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	2	...	2
...	...	...	...	...	...	...	2	...	...	1	1	...	5	1	...	...	...	...	1
...	...	...	...	...	...	...	1	1	...	...	...	...	1	...	2	...	...	...	1
...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	2	...	...
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...	...	...	...	...	...	1	...	1	...	2	...	...	3	4	...	1	2	1	1
...	...	...	...	...	...	...	4	...	...	2	...	...	1	1	...	2	...	...	...
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...	..	1	6	3	2	17	39	14	...	16	9	6	35	53	23	6	28	4	14
1	...	1	7	6	2	42	69	22	1	35	23	11	71	84	40	24	50	13	42
5	..	1	...	1	2	37	65	17	7	20	26	9	85	59	27	18	43	25	45
...	...	...	2	...	...	6	10	3	...	1	3	...	6	5	2	...	2	2	1
...	...	...	...	...	...	1	4	2	...	1	1	...	1	3	1	1	...	1	3
...	...	...	...	...	...	...	...	1	...	1	...	...	2	2	...	1	...	...	...
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...	...	1	...	...	...	2	1	1	...	2	...	...	...	...	...	...	...	1	3
...	...	...	...	...	2	3	4	...	...	...	3	...	1	1	...	1	1	1	1
...	...	...	1	1	...	...	2	1	...	...	...	...	1	1	1	...	1	3	1
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	2	...	1
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1	...	1	1	1	2	25	17	8	1	19	14	3	37	41	3	7	28	10	11
1	...	2	4	2	4	30	42	17	1	27	22	3	59	61	9	10	40	23	24
1	1	...	3	2	2	28	26	9	1	25	21	5	66	60	31	21	36	17	19

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT.										
BUFFALO	376,587	488	15.8	84	36	71	5	8	....	....
TONAWANDA	7,904	8	....	2	0	2	....	1	....	....
Amherst	4,500	7	....	3	0	1	....	....	....	....
NORTH TONAWANDA	10,197	11	....	4	3	1	....	....	....	....
LOCKPORT	17,552	17	13.0	1	1	3	....	....	....	....
NIAGARA FALLS	26,560	29	13.0	11	2	2	....	7	....	....
Medina	5,114	14	....	0	0	4	....	....	....	....
Albion	5,174	5	....	0	0	3	....	....	....	....
Brockport	3,627	4	....	0	0	1	....	....	....	....
ROCHESTER	181,666	240	15.5	28	12	48	1	3	....	....
Palmyra	4,042	5	....	1	0	2	....	....	....	....
Newark	4,554	5	....	0	0	1	....	....	....	....
Lyons	4,758	10	....	2	0	4	....	....	....	....
Clyde	2,552	5	....	1	0	0	....	....	....	....
OSWEGO	22,572	32	17.0	5	3	7	....	2	....	....
FULTON	8,847	7	....	3	0	0	....	....	....	....
Richland	3,611	4	....	0	0	3	....	....	....	....
Rest of District	257,500	294	14.0	42	9	110	....	4	1	....
Totals for the District	947,500	1,185	14.5	187	66	263	6	25	1	....
Totals for January, 1905	945,200	1,151	15.5	183	84	251	4	11	....	....
Totals for the State	8,198,500	11,838	17.2	1,881	1,012	2,200	94	120	8	....
Average past five years	....	11,165	18.3	1,577	1,201	2,260	63	144	10	14
Totals for January, 1905	7,918,000	11,896	18.5	1,847	1,041	2,210	149	104	4	....

THE SANITARY DISTRICTS into which the State is divided are as follows: *Maritime District:* Includes Greater New York, Long Island (Nassau and Suffolk counties) and Westchester county. *Hudson Valley District:* All the counties on either side of the Hudson river except Westchester, to and including Albany and Rensselaer. *Adirondack and Northern District:* The Northern section of the State—the counties of Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis. *Mohawk Valley District:* Schenectady, Schoharie, Saratoga, Montgomery, Fulton,

JANUARY, 1906 — (*Concluded*).

DISEASES.						OTHER CAUSES OF DEATH.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal) under 5 years).	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
2	3	...	3	4	22	44	52	10	21	30	25	20	50	57	30	27	20	20	35
1		...	...	...	...	1	...	1	...	1	...	...	1	...	...	...	...	...	2
.	..	...	...	...	...	2	...	...	...	...	...	...	...	1	...	1	1	1	1
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.	..	...	...	...	...	1	2	...	...	...	...	...	2	2	...	...	1	1	1
	..	...	...	...	...	...	...	...	...	1	1	...	1	...	...	2	...	...	...
.	..	...	2	6	...	1	3	...	...	2	2	...	2	6	...	1	2	2	1
.	..	...	1	...	...	...	...	...	...	...	...	...	1	2	1	...	...	1	1
.	..	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	3	...	...
.	...	2	1	5	5	21	16	6	2	21	11	5	51	33	16	18	36	12	28
6	4	6	8	25	29	98	103	28	24	86	63	25	141	150	68	62	81	55	92
7	17	6	5	23	21	84	83	31	21	67	45	17	158	145	57	82	76	38	153
73	127	53	58	280	188	1,183	1,884	407	122	643	786	149	1,283	1,244	493	584	465	514	1,078
122	77	36	51	306	198	1,185	1,439	941	100	616	800	132	1,253	1,211	450	545	505	500	1,069
103	59	41	45	260	202	1,169	1,819	437	107	610	784	177	1,324	1,253	499	572	474	529	1,175

Herkimer and Oneida counties. *Southern Tier District:* The seven counties along the southern border of the State. *East Central District:* Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties. *West Central District:* Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties. *Lake Ontario and Western District:* Oswego, Wayne, Monroe, Orleans, Niagara, and Erie counties.

VITAL STATISTICS

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns in

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES. Deaths under 1 year of age.	AGES. Deaths 1 to 5 years of age.	AGES. Deaths at 70 years and over.	EPIDEMIC Cerebro-spinal meningitis.	EPIDEMIC Typhoid fever.	EPIDEMIC Malarial diseases.	EPIDEMIC Smallpox.
MARITIME DISTRICT.										
City of New York	4,152,860	6,293	19.7	1,245	797	632	77	32	....	....
BOROUGH OF MANHATTAN	2,174,335	3,310	19.8	748	371	314	55	21	....	....
BOROUGH OF THE BRONX	290,097	544	24.4	76	72	38	6	....	....	....
BOROUGH OF BROOKLYN	1,404,569	2,064	19.2	355	321	227	16	10	....	....
BOROUGH OF QUEENS	209,685	272	17.0	55	27	26	....	1	....	....
BOROUGH OF RICHMOND	74,173	103	18.0	11	6	27	....	....	....	....
Oyster Bay	20,545	15	....	0	0	8	....	....	....	....
Hempstead	34,746	46	....	5	3	14	....	1	....	....
North Hempstead	14,163	22	....	5	2	1	....	....	....	....
Southold	8,989	6	....	0	0	1	....	....	....	....
Sag Harbor	3,048	5	....	0	0	1	....	....	....	....
Huntington	10,236	15	....	2	1	4	....	1	....	....
Brookhaven	16,050	20	....	3	1	3	1	1	....	....
YONKERS	61,716	76	14.5	13	11	8	....	....	....	....
Greenburgh	18,635	21	....	3	5	3	....	....	....	....
MOUNT VERNON	25,006	28	14.6	8	5	4	1	1	....	....
Port Chester	11,200	14	....	5	4	1	....	1	....	....
Ossining	7,135	2	....	0	0	1	....	....	....	....
NEW ROCHELLE	20,480	26	16.7	7	1	8	....	1	....	....
Peekskill	13,200	18	....	4	3	4	....	....	....	....
White Plains	11,579	15	....	3	0	0	....	....	....	....
Mamaroneck	5,090	10	....	2	0	2	....	....	....	....
Rest of District	98,262	156	20.0	18	5	38	....	....	1	....
Totals for the District	4,523,940	6,788	21.0	1,323	838	736	79	38	1	....
Totals for February, 1905	4,273,767	6,620	21.0	1,156	693	741	186	28	4	4
HUDSON VALLEY DISTRICT.										
ALBANY	100,000	147	19.1	14	6	24	....	1	....	....
COHOES	24,183	47	25.0	13	3	2	....	4	....	....
TROY	76,910	100	17.0	8	0	20	1	3	....	....
WATERVLIET	14,600	20	18.0	4	3	1	....	1	....	....
Green Island	4,878	9	....	1	1	0	....	....	....	....
Hoosick Falls	5,251	9	....	1	0	2	....	1	....	....
RENSSELAER	10,715	12	15.5	3	0	2	....	1	....	....
Coxsackie	4,317	8	....	0	0	3	....	....	....	....
Catskill	5,294	7	....	2	0	2	....	....	....	....
HUDSON	10,290	17	21.5	1	0	5	....	....	....	....
KINGSTON	25,556	23	12.0	2	1	3	....	1	....	....
Ellenville	2,872	11	....	1	1	3	....	....	....	....
Marbletown	3,000	3	....	0	0	1	....	....	....	....
Rosendale	4,670	7	....	0	0	2	....	....	....	....
Esopus	4,786	5	....	1	0	2	....	....	....	....
Saugerties	3,833	10	....	3	1	3	....	....	....	....
POUGHKEEPSIE	25,379	33	16.8	5	1	7	....	1	....	....
Fishkill	13,183	16	....	1	2	3	....	....	....	....
Wappingers Falls	3,588	4	....	0	0	1	....	....	....	....
NEWBURG	26,500	53	26.0	8	2	7	1	....	....	....
Port Jervis	9,700	18	....	8	0	3	....	....	....	....
MIDDLETOWN	14,516	24	21.5	4	1	6	....	....	....	....
Warwick	6,690	11	....	2	0	3	....	....	....	....
Goshen	5,023	8	....	0	0	5	....	....	....	....
Montgomery	6,652	12	....	1	0	5	....	....	....	....
Haverstraw	10,482	7	....	0	1	5	....	....	....	....
Nyack	4,441	....	....	....	....	....	....	....	....	....
Ramapo	10,142	10	....	3	1	1	....	....	....	....
Rest of District	264,000	298	15.0	38	12	88	3	2	....	....
Totals for the District	705,500	929	17.2	124	36	209	5	15	....	....
Totals for February, 1905	696,000	1,108	19.3	147	57	281	12	15	....	....

FOR FEBRUARY, 1906.

Roman type; Populations estimated to date printed in full faced figures.

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal) under 5 years.	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
DISEASES.						OTHER CAUSES OF DEATH.													
43	162	36	12	238	115	732	1,187	162	70	263	486	70	563	459	234	313	69	335	635
19	63	23	4	74	66	346	616	86	33	142	262	38	298	252	137	171	30	201	373
4	16	2	1	53	8	143	66	4	6	20	40	6	34	31	17	28	4	21	34
15	79	11	6	100	34	204	427	64	24	85	164	22	195	141	69	83	26	90	198
4	2		1	9	6	23	60	7	5	9	15	3	26	22	9	25	6	17	22
	2			2	1	16	18	1	2	7	5	1	10	13	2	6	3	6	8
						1	2	1		2			3	2	2	1	1		
1	1			1		3	4	1	1	2	2	1	6	8	2	5	5	1	1
					2	2	2	1		2	1		3	2	1	4			2
						1	2			1			1	1					
						1	2						1					1	
						2	5	1			1	1	2	2					
			1			1	3	3	2	1	3		1	3					
				1		6	10	10		7	6		5	10	1	8		6	6
	4		2			1		1		3	2		3	2				2	1
				3	2	3	2	2	1	2			3	2	1			3	2
						1	3				1		1	1	1			1	4
		1													1				
						3	4			2	1	1	5	3			1	1	4
			1			1	2	1	1	3				1	3		2	2	1
		1				2	1	2	1	2	1		1	1		1			2
			1				3	1					2			2			1
1	1	1	3			19	20	6	1	8	19	1	18	24	7	5	7	3	11
45	168	39	20	243	119	779	1,252	192	77	298	523	74	618	521	253	339	85	355	670
71	26	37	29	184	129	735	1,147	182	88	276	473	96	658	537	234	306	88	378	724
			1			24	16	6		16	8	1	29	16	13	3	1	6	6
				1	1	6	5	4	1	4	2		3	1	2	1	1	3	8
1					2	16	10	1	1	6	5	2	14	10	6	3	6	9	4
				1		2		3		3	2		2	1		1	1	1	2
								2		1	1		2	1	1			1	
							2					1	2	1			1	1	
							2			3	1		1	2		1			1
						1	1				2		1	3					
					1			1			1			3			1		
						2	1	2		1	2		3	2	1	1	1		1
						5	1	3			2		5	3		1			2
		1				1	2	1					1	4			1		
							1						1				1		
							2			1				2			1		1
													3				1		1
					1		2			1				3			1		2
						7	5			1	1	3	4	2	2	2	2		3
				1			2	3		4				1	1	1	1	2	
						1	1			1	1								
				1	1	5	9	1		5	2		5	8	3	4	2	1	5
			1			1	3	1					3	3		1	1		4
						2	4	1		3	1		1	3	2	2	1		4
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							1	1						3	1	1		2	1
				4	1	23	41	19	2	14	15	4	35	48	13	19	25	13	17
1		1	2	8	7	98	115	49	4	67	50	11	120	128	48	44	52	41	63
3	17	3	7	14	7	112	144	64	7	70	65	19	116	142	46	57	62	36	90

VITAL STATISTICS F

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES.			EPIDE		
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.
ADIRONDACK AND NORTHERN DISTRICT.									
WATERTOWN	25,447	38	19.3	4	1	10	....	....	....
Ellisburgh	3,740	6	.....	0	0	3	....	....	....
Carthage	3,404	1	.....	0	0	0	....	....	....
Clayton	4,100	3	.....	1	0	0	....	....	....
OGDENSBURGH	13,179	7	7.0	0	0	0	....	....	....
Gouverneur	6,582	4	.....	0	0	0	....	....	....
Potsdam	4,162	5	.....	0	0	1	....	....	....
Canton	6,800	1	.....	0	0	0	....	....	....
Malone	6,478	4	.....	0	0	2	....	....	....
PLATTSBURG	10,184	11	14.0	4	1	1	....	....	....
Glens Falls	14,650	22	.....	1	1	3	....	....	....
Whitehall	4,148	4	.....	1	1	0	....	....	....
Fort Edward	5,300	5	.....	3	0	0	....	1	....
Sandy Hill	5,321	7	.....	1	0	2	....	....	....
Granville	6,487	13	.....	1	0	2	....	....	....
Greenwich	4,338	5	.....	0	0	2	....	....	....
Lowville	3,921	.....	.....	.....	.....	.....	....	....	....
Rest of District	279,800	365	17.0	41	17	143	....	3	....
Totals for the District	**408 100**	**501**	**16.0**	**57**	**21**	**169**	....	**4**	....
Totals for February, 1905	**400,000**	**520**	**15.5**	**78**	**29**	**157**	**2**	**9**	....
MOHAWK VALLEY DISTRICT.									
SCHENECTADY	58,387	80	17.8	18	7	10	....	1	....
Cobleskill	3,731	7	.....	0	0	3	....	1	....
AMSTERDAM	23,943	36	19.5	5	5	6	....	....	....
Fort Plain	2,600	4	.....	0	0	2	....	....	....
JOHNSTOWN	9,845	7	.....	1	1	1	....	....	....
GLOVERSVILLE	18,672	24	16.5	4	1	3	....	....	....
LITTLE FALLS	11,122	8	10.0	1	0	2	....	....	....
Herkimer	6,600	6	.....	1	0	1	....	....	....
Ilion	5,924	5	.....	0	0	0	....	....	....
UTICA	62,934	101	20.8	18	8	24	1	2	....
Whitestown	6,895	10	.....	2	0	2	....	....	....
ROME	16,562	24	19.0	4	2	7	....	....	....
Boonville	3,167	7	.....	0	0	2	....	....	....
Camden	3,750	3	.....	0	0	2	....	....	....
Waterford	6,000	5	.....	1	0	1	....	....	....
Mechanicville	5,877	7	.....	3	0	0	....	....	....
Ballston Spa	4,131	0	.....	.....	.....	.....	....	....	....
Saratoga Springs	13,000	22	.....	0	2	3	....	....	....
Rest of District	181,600	207	14.5	19	5	80	1	2	....
Totals for the District	**444,740**	**563**	**16.0**	**77**	**31**	**149**	**2**	**6**	....
Totals for February, 1905	**433,640**	**573**	**17.0**	**75**	**27**	**173**	**5**	**3**	**1**
SOUTHERN TIER DISTRICT.									
BINGHAMTON	42,036	53	16.4	6	2	9	....	1	....
Owego	5,010	8	.....	0	1	4	....	....	....
Candor	3,148	5	.....	0	0	1	....	....	....
Waverly	4,915	12	.....	1	0	4	....	....	....
ELMIRA	34,687	36	13.5	5	2	4	....	4	....
Horseheads	4,826	4	.....	0	0	0	....	....	....
HORNELLSVILLE	13,259	19	18.5	3	1	2	....	....	....
Bath	3,700	4	.....	0	0	0	....	....	....
CORNING	13,515	13	12.5	1	0	2	....	....	1

February, 1906 — (*Continued*).

Diseases.						Other Causes of Death.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal) under 5 years.	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
						3	3	1		2			9	4	4	2	4	3	3
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					1	4	3	1		3			5	1	1	2	1		
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					1		1	1										1	1
											2		2		2				1
						1	2			1	2		1	3					2
			1			1		1					1	1			1		
1	1	1	2	1	2	49	40	17	1	23	23	4	44	42	15	13	49	10	24
1	1	1	3	1	5	63	54	23	1	33	28	5	64	57	25	20	60	15	37
1	11	...	2	4	3	47	52	40	7	39	31	9	61	60	27	12	43	18	42
		1	1	2	1	7	13	5	3	8	1	2	4	11	3	5	1	3	8
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			1			7	4	3	1	3	2	1	6	3		2			3
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						1	1						2	2					1
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						2		1		1			1	1			1		1
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						3					1							1	
3	1			2	3	8	10	3	3	10	4	3	10	14	4	6	4	1	9
					1	1	2						1	2					2
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							1			1				2					1
							1	1		1	2			1				1	
						3	4	1		1	1	1	4	3	3	1			
1	...	1	...	3	1	17	21	6	...	11	13	1	31	28	18	9	20	7	16
5	1	3	2	9	6	56	64	26	7	41	29	8	66	77	32	27	34	14	47
5	2	4	4	8	3	42	74	27	4	40	28	7	67	79	26	19	60	19	46
				1		6	5	1	2	6	5	1	1	10	5	1	3	2	3
				1		1	1						2	1		1			1
										1			1	2					1
						2							1	2	2	1	2	1	1
				3		7	1	1		1	1	1	7	4	1		2	1	2
						1				1			1	1					
			2			3	1	1		2		2	2	1	3	2			
						1							2			1			
						2	1			1			2	3		1		1	1

VITAL STATISTICS FO

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEM Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.
SOUTH'N TIER DIST.—(*Concluded*).									
Wellsville	4,355	5	....	3	0	2	....	....	....
OLEAN	10,163	14	18.0	2	1	2	1	....	....
Salamanca	5,455	3	....	1	0	0	....	....	....
DUNKIRK	15,250	28	24.0	11	0	2	....	....	....
JAMESTOWN	26,160	28	14.0	1	2	9	....	1	....
Westfield	2,823	6	....	0	1	4	....	....	....
Fredonia	5,148	6	....	2	1	1	....	....	....
Rest of District	244,500	324	17.5	34	8	116	3	7	....
Totals for the District	439,000	568	16.7	70	19	162	4	13	1
Totals for February, 1905	435,000	570	16.2	57	15	197	11	....	....
EAST CENTRAL DISTRICT.									
SYRACUSE	117,500	123	13.6	32	5	16	....	1	....
Baldwinsville	2,961	2	....	0	0	1	....	....	....
DeWitt	6,252	7	....	2	0	2	....	....	....
CORTLAND	11,272	12	14.0	2	0	1	....	....	....
Homer	2,536	2	....	0	0	1	....	....	....
ONEIDA	8,420	14	21.5	1	2	5	....	....	....
Hamilton	3,614	1	....	0	0	0	....	....	....
Cazenovia	3,557	7	....	1	0	1	....	....	....
Canastota	3,244	5	....	0	0	3	....	1	....
Norwich	7,115	6	....	1	0	4	....	....	....
Oneonta	8,054	12	....	1	0	8	....	....	....
Worcester	2,328	1	....	0	0	1	....	....	....
Cooperstown	2,446	4	....	0	0	3	....	....	....
Walton	5,000	2	....	0	1	1	....	....	....
Sidney	4,319	5	....	1	1	1	1	....	....
Liberty	5,483	9	....	2	0	1	....	....	....
Rest of District	220,100	251	15.0	31	10	107	1	....	....
Totals for the District	414,200	463	14.5	74	19	156	2	2	....
Totals for February, 1905	414,500	633	19.5	84	29	201	3	4	....
WEST CENTRAL DISTRICT.									
AUBURN	31,422	51	21.1	6	4	9	....	2	....
ITHACA	14,615	15	13.5	0	2	4	1	....	....
Hector	3,888	3	....	0	0	2	....	....	....
Waterloo	4,123	9	....	2	0	3	....	....	....
Seneca Falls	6,733	12	....	1	0	5	....	....	....
GENEVA	12,249	20	21.1	0	0	5	....	1	....
Canandaigua	7,332	15	....	0	1	4	....	1	....
Manchester	4,809	10	....	2	0	2	....	....	....
Phelps	4,757	4	....	0	0	1	....	....	....
Penn Yan	4,504	4	....	0	0	4	....	....	....
Batavia	10,080	10	....	1	2	0	2	....	....
Dansville	3,908	3	....	0	0	2	....	....	....
Le Roy	3,400	1	....	0	0	1	....	....	....
Warsaw	4,469	5	....	0	1	4	....	....	....
Rest of District	199,400	266	17.3	27	6	122	4	5	....
Totals for the District	315,700	428	17.5	39	16	168	7	9	....
Totals for February, 1905	320,600	444	17.3	38	12	182	5	7	....

FEBRUARY, 1906 — (*Continued*).

Diseases.						Other Causes of Death.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal under 5 years.)	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
								1									2		2
		1				1	1		2	2	1		1	2	2				
							1											1	1
			2			2	5	2		2	1		3	2	1	4			4
					1			2		2			4	8	2	1	4	1	2
								1					1	1	1				2
								1		1				2			1		1
		2	4	2	1	21	27	13	1	22	12	6	56	46	16	10	46	7	22
		3	8	7	2	47	43	23	5	41	20	10	84	85	33	22	60	14	43
	2	5	2	2		38	68	24	5	46	23	7	92	74	21	36	54	20	49
2	2		4		1	9	8	4	1	7	4	3	20	17	9	3	5	5	18
															1	1			
		1						1		1	1	1		1		1			
				1		3	2						1	1	1	2			1
								1										1	
							4			1	1		4	2	1				1
						1													
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											1			1	1		1		
										1		1							
					1						2		1						
						4		1					1	1				2	
	1	1	2	2	2	19	32	12		13	14	3	36	35	13	5	25	14	21
2	3	3	8	4	4	36	50	20	2	24	25	8	71	60	27	13	36	22	41
5	2	2		4	4	47	95	40	4	38	38	3	82	76	87	38	47	24	42
	1		1	1	2	6	10	1		4	4		5	7	1	3			3
						1	2	2		1			2		2	3		1	
							1							1		1			
										1			2	3	1				1
						1		1		2			3	1		1	1		1
						2	8	1		2			7	3	1		1	1	
		1					2	3				1	1	2	1				
						1	2			1	1		1	1			1	3	2
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1			2		1	11	26	12	1	19	14	6	45	39	9	13	32	10	16
1	1	1	3	1	3	22	47	21	1	31	21	8	70	59	16	25	38	17	26
1	1	1	1	1		24	53	19	5	25	27	6	56	97	20	12	44	15	24

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT.										
BUFFALO	376,587	448	15.5	85	29	84	4	4	....	...
TONAWANDA	7,904	7	12.0	0	1	0	1	1	....	...
Amherst	4,500	....	....	....	....	....	....	....	....	...
NORTH TONAWANDA	10,197	15	19.5	3	4	2	....	....	....	...
LOCKPORT	17,552	27	20.0	3	1	6	....	2	....	...
NIAGARA FALLS	26,560	30	15.0	10	0	2	....	6	....	...
Medina	5,114	5	....	1	0	0	....	....	....	...
Albion	5,174	5	....	0	0	2	....	....	....	...
Brockport	3,627	2	....	0	0	1	....	....	....	...
ROCHESTER	181,666	237	17.0	28	22	48	1	3	....	...
Palmyra	4,042	4	....	1	0	2	....	....	....	...
Newark	4,554	6	....	0	0	2	....	....	....	...
Lyons	4,758	10	....	0	1	2	....	....	....	...
Clyde	2,552	3	....	0	0	1	....	....	....	...
OSWEGO	22,572	33	19.0	4	3	11	....	1	....	...
FULTON	8,847	15	22.1	5	5	2	....	....	....	...
Richland	3,611	4	....	0	0	3	....	....	....	...
Rest of District	257,500	260	13.0	12	8	88	1	2	....	...
Totals for the District	947,500	1,111	15.2	162	74	241	7	19	....	...
Totals for February, 1905	945,200	1,260	17.5	182	182	302	4	21	....	...
Totals for the State	8,198,500	11,351	18.0	1,926	1,054	1,990	106	106	2	1
Average past five years	....	11,397	19.0	1,425	1,140	2,220	77	118	9	19
Totals for February, 1905	7,918,000	11,730	18.0	1,817	1,044	2,235	218	88	5	4

THE SANITARY DISTRICTS into which the State is divided are as follows: *Maritime District:* Includes Greater New York, Long Island (Nassau and Suffolk counties) and Westchester county. *Hudson Valley District:* All the counties on either side of the Hudson river except Westchester, to and including Albany and Rensselaer. *Adirondack and Northern District:* The Northern section of the State—the counties of Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis. *Mohawk Valley District:* Schenectady, Schoharie, Saratoga, Montgomery

FEBRUARY, 1906 — (*Concluded*).

...DISEASES.						OTHER CAUSES OF DEATH.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal under 5 years.)	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
2	1	1	3	6	8	45	25	53	3	25	19	11	65	51	18	26	23	25	30
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	1	1	...	3	2	20	18	9	1	18	14	4	34	37	13	12	27	9	34
3	3	2	8	27	12	97	68	85	11	71	62	20	135	141	53	58	75	54	100
4	17	6	10	24	13	95	163	76	15	88	43	24	157	171	57	58	78	64	72
[illegible]	177	53	54	300	158	1,198	1,693	439	108	606	758	144	1,228	1,128	487	548	440	532	1,027
[illegible]	93	48	58	258	185	1,142	1,430	909	116	593	736	143	1,219	1,179	416	497	498	550	977
[illegible]	78	58	55	241	159	1,140	1,796	472	135	632	726	173	1,289	1,236	468	538	476	574	1,089

...ton, Herkimer and Oneida counties. *Southern Tier District:* The seven counties along the southern border of the State. *East Central District:* Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties. *West Central District:* Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties. *Lake Ontario and Western District:* Oswego, Wayne, Monroe, Orleans, Niagara, and Erie counties.

VITAL STATISTIC

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns i

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMI Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT.										
City of New York	4,152,860	7,104	20.1	1,327	1,000	719	106	25	5	...
BOROUGH OF MANHATTAN	2,174,335	3,765	20.3	802	504	335	64	7	3	...
BOROUGH OF THE BRONX	290,097	627	25.0	84	114	57	6	1	....	...
BOROUGH OF BROOKLYN	1,404,569	2,293	19.3	377	339	272	33	13	2	...
BOROUGH OF QUEENS	209,685	293	16.4	50	33	35	1	4	....	...
BOROUGH OF RICHMOND	74,173	126	20.1	14	10	20	2	....	....	...
Oyster Bay	20,545	27	15.0	1	0	11	....	....	....	...
Hempstead	34,746	35	12.0	11	5	3	....	....	....	...
North Hempstead	14,163	19	.....	1	1	2	....	1	....	...
Southold	8,989	19	.....	1	0	5	....	2	....	...
Sag Harbor	3,048	2	.....	0	0	2	....	...	....	...
Huntington	10,236	6	.....	1	0	3	....	....	....	...
Brookhaven	16,050	33	.....	4	0	18	1	....	1	...
YONKERS	61,716	107	20.0	21	12	8	1	....	....	...
Greenburgh	18,635	26	.....	3	7	6	....	....	....	...
MOUNT VERNON	25,006	40	18.8	7	3	6	2	1	....	...
Port Chester	11,200	16	.....	6	2	2	1	1	....	...
Ossining	7,135	17	.....	1	4	1	....	1	....	...
NEW ROCHELLE	20,480	22	13.0	3	1	6	....	....	....	...
Peekskill	13,200	20	.....	1	2	7	....	....	....	...
White Plains	11,579	17	.....	3	4	1	1	....	....	...
Mamaroneck	5,090	9	.....	1	1	1	....	....	....	...
Rest of District	98,262	182	21.8	19	5	47	1	....	....	...
Totals for the District	4,523,940	7,701	20.0	1,410	1,047	848	113	31	6	...
Totals for March, 1905	4,273,767	7,500	20.7	1,309	847	938	419	35	4	
HUDSON VALLEY DISTRICT.										
ALBANY	100,000	150	17.8	9	7	[illegible]	1	2	....	...
COHOES	24,183	44	21.5	9	7	5	....	1	....	...
TROY	76,910	149	22.3	13	5	[illegible]	1	8	....	...
WATERVLIET	14,600	19	16.0	3	4	1	....	2	....	...
Green Island	4,878	8	.....	3	0	1	....	....	....	...
Hoosick Falls	5,251	7	.....	1	1	1	....	....	....	...
RENSSELAER	10,715	18	21.5	6	1	7	....	....	....	...
Coxsackie	4,317	11	.....	1	0	4	....	....	....	...
Catskill	5,294	4	.....	1	0	1	....	....	....	...
HUDSON	10,290	19	22.5	1	2	4	....	....	....	...
KINGSTON	25,556	38	17.5	2	1	7	....	....	....	...
Ellenville	2,872	5	.....	0	0	1	....	....	....	...
Marbletown	3,000	1	.....	0	0	0	....	....	....	...
Rosendale	4,670	6	.....	0	0	1	....	....	....	...
Esopus	4,786	6	.....	0	0	0	....	1	....	...
Saugerties	3,833	5	.....	0	0	0	....	....	....	...
POUGHKEEPSIE	25,379	43	20.0	8	4	9	....	....	1	...
Fishkill	13,183	35	.....	6	2	8	....	....	....	...
Wappingers Falls	3,588	4	.....	1	0	1	....	....	....	...
NEWBURG	26,500	55	24.4	9	1	9	2	....	....	...
Port Jervis	9,700	12	.....	1	1	1	....	....	....	...
MIDDLETOWN	14,516	21	17.0	2	1	5	....	....	....	...
Warwick	6,690	6	.....	1	0	4	....	....	....	...
Goshen	5,023	9	.....	1	0	3	....	....	....	...
Montgomery	6,652	8	.....	2	1	2	....	....	....	...
Haverstraw	10,482	9	.....	1	1	.....	....	....	....	...
Nyack	4,441	15	.....	4	1	2	....	....	....	...
Ramapo	10,142	17	.....	3	0	6	....	....	....	...
Rest of District	268,000	371	15.5	42	14	123	2	1	....	...
Totals for the District	705,500	1,095	18.0	130	54	263	6	15	1	...
Totals for March, 1905	696,000	1,232	20.6	174	103	311	26	23	....	...

FOR MARCH, 1906.

...man type; **Populations estimated to date printed in full faced figures.**

...seases.						Other Causes of Death.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal under 5 years).	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
[illegible]	[illegible]	27	19	241	150	872	1,395	187	87	303	491	103	637	471	236	336	79	370	688
[illegible]	[illegible]	14	8	87	96	426	793	106	46	163	264	57	347	234	123	187	35	222	379
[illegible]	49	1	2	54	7	138	90	10	9	18	37	6	38	26	18	31	5	29	42
[illegible]	59	11	9	86	37	252	437	58	29	103	154	32	208	177	84	94	33	105	232
1	5	1		14	3	32	58	13	1	13	25	7	32	28	7	12	3	9	24
	3				7	24	17		2	6	11	1	12	6	4	12	3	5	11
			1				6			1	2		2	5	2	3	4		1
1	3			2		2	6	5		3	1		2	8	8		1	2	1
	1					4	1	1					1	4	1	3		2	
						2				4			2	5	1	1		1	1
								1			1								
										1			2	1				1	1
			1			5	[illegible]			1	3		3	4	1	3	5		2
		3	1	1	3	17	19	1	2	12	7	1	12	12	2	2	2		9
	2		2			1	4	1		3	3		2	3		2	2		1
			1			4	9	2		1	3		8	3			2		4
1			1	1			3	1					2	3	1	1			
				1		2	3			1	1		4	1		2	1		
				1		2	2			1	3	1	2	3		1	2	1	3
						3	3			1	3		2	5		2	1		
					2		2	2		1	1		1	1	2	3			1
							1	1		1	1		2	1	1		1		
			1	2	1	19	21	9	1	9	12		26	31	15	9	9	8	8
[illegible]	234	30	27	249	156	933	1,478	211	90	343	532	105	710	556	265	368	109	385	720
[illegible]	50	37	40	148	184	902	1,083	183	92	324	535	95	694	650	283	372	91	327	878
			2	1		16	24	6	2	8	13	2	27	18	13	5	4	4	2
					2	6	7	7		3	1		3	4	1		2	3	4
1		1			1	21	17	9	1	4	12	1	17	10	9	8	6	7	15
1						2		3	1	3			2	1			1	1	2
						1		1		1			2				1		2
						1		1		1			1	1	1				1
					1	1	3	1		1		1	4	2			1		3
						1	1	1		2	1				1		2		2
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			1			3	2		1	2	1		2	2	1		1	2	1
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							2			1			1			1			
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						1		1		1			1				1		1
		1					1	1					1	1					
							1			2			1		1				
		1				6	2	5		3	2	2	5	8		1	2	1	4
	1					3	7	1			1		3	3	2	4	3	4	3
							1						1	1			1		
				1		9	7	2		6	6		6	8	2	1	1	1	3
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						3	2		1		2		4	3	1	2	1	1	1
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						1		1		1	2		2	1				1	
		1			1		2						3			1			
	1					1		1						1		1		2	2
					1			2		1	1		2	2	3	1			2
						4				1	2		1	4		1	1		3
	1	1	3	4	5	40	40	14	3	23	28	3	42	52	19	21	23	15	31
2	3	5	6	7	11	125	125	58	12	68	76	9	131	128	58	52	64	47	86
51	25	4	9	11	16	108	134	69	8	88	69	16	154	150	45	60	82	33	

9

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES. Deaths under 1 year of age.	AGES. Deaths 1 to 5 years of age.	AGES. Deaths at 70 years and over.	EPIDEMIC Cerebro-spinal meningitis.	EPIDEMIC Typhoid fever.	EPIDEMIC Malarial diseases.	EPIDEMIC Smallpox.
ADIRONDACK AND NORTHERN DISTRICT.										
WATERTOWN	25,447	30	14.0	2	1	6	....	....	....	....
Ellisburgh	3,740	5	.....	0	0	5	....	....	....	....
Carthage	3,404	5	.....	0	0	0	....	1	....	....
Clayton	4,100	11	.....	1	0	5	....	....	....	....
OGDENSBURGH	13,179	18	16.5	0	1	2	....	....	....	....
Gouverneur	6,582	9	....	1	0	4	....	2	....	....
Potsdam	4,162	3	.....	0	0	2	....	....	....	....
Canton	6,800	13	.....	0	1	6	....	....	....	....
Malone	6,478	11	.....	1	2	1	....	....	....	....
PLATTSBURG	10,184	11	13.0	2	1	1	....	....	....	....
Glens Falls	14,650	27	22.0	5	1	8	....	1	....	....
Whitehall	4,148	2	.....	0	0	0	....	1	....	....
Fort Edward	5,300	7	.....	1	0	2	....	....	....	....
Sandy Hill	5,321	4	.....	2	0	0	1	....	....	....
Granville	6,487	4	.....	0	0	1	....	....	....	....
Greenwich	4,338	4	.....	0	0	0	....	....	....	....
Lowville	3,921	17	.....	0	1	7	....	....	....	....
Rest of District	279,800	367	15.5	31	15	119	8	1	....	....
Totals for the District	408,100	548	16.0	46	23	169	9	6	....	....
Totals for March, 1905	400,000	594	17.0	73	31	193	5	7	....	....
MOHAWK VALLEY DISTRICT.										
SCHENECTADY	58,387	64	13.0	15	7	8	....	1	....	....
Cobleskill	3,731	9	.....	0	0	1	....	....	....	....
AMSTERDAM	23,943	44	21.5	11	4	4	....	1	....	....
Fort Plain	2,600	3	.....	1	0	1	....	....	....	....
JOHNSTOWN	9,845	15	17.5	2	1	3	....	....	....	....
GLOVERSVILLE	18,672	22	14.2	1	0	5	....	....	....	....
LITTLE FALLS	11,122	22	23.0	3	2	6	1	....	....	....
Herkimer	6,600	14	.....	1	0	6	....	....	....	....
Ilion	5,924	10	.....	0	1	2	....	....	....	....
UTICA	62,934	120	24.0	18	9	29	1	2	....	....
Whitestown	6,895	6	.....	3	0	1	....	....	....	....
ROME	16,562	18	13.5	2	0	7	....	....	....	....
Boonville	3,167	4	.....	0	0	1	....	....	....	....
Camden	3,750	6	.....	0	1	2	....	....	....	....
Waterford	6,000	7	.....	0	1	2	....	....	....	....
Mechanicville	5,877	4	.....	1	0	0	....	....	....	....
Ballston Spa	4,131	7	.....	0	0	2	....	....	....	....
Saratoga Springs	13,000	27	24.0	1	2	7	1	1	....	....
Rest of District	181,600	270	17.5	15	9	117	3	2	....	....
Totals for the District	444,740	681	18.0	74	37	204	6	7	....	....
Totals for March, 1905	433,640	611	16.4	75	30	184	13	5	....	....
SOUTHERN TIER DISTRICT.										
BINGHAMTON	42,036	60	17.0	9	1	15	....	1	....	....
Owego	5,010	11	.....	0	2	3	....	....	....	....
Candor	3,148	7	.....	0	0	4	....	....	....	....
Waverly	4,915	8	.....	0	0	3	....	....	....	....
ELMIRA	34,687	46	14.6	2	5	10	....	....	....	....
Horseheads	4,826	4	.....	0	0	3	....	....	....	....
HORNELLSVILLE	13,259	12	12.0	4	0	4	1	....	....	....
Bath	3,700	3	.....	0	0	0	....	....	....	....
CORNING	13,515	13	12.0	0	1	1	....	....	....	....
Wellsville	4,355	7	.....	0	0	1	....	....	....	....

MARCH, 1906 — (*Continued*).

Diseases.						Other Causes of Death.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
					1	1	6	2			1	1	7	7	2	1	1		
							1							2		1	1		
						1				1				1	1				
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						2	1			4	2		3	3				2	1
						1							3	1		1			1
							1						1				1		
							1	2			1		4	2		1	2		
				1							2	1	2	3	1	1			
						1	1	1		1				2		2	1		2
		1				3	9				1	1	3	3		1	1	1	2
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							1			2								1	
						1		1		1		1	2	2	2		3	4	
2			5	2	1	37	47	13	5	17	20	3	51	49	16	10	25	18	37
2		1	5	3	2	49	72	21	5	26	32	7	79	79	23	18	38	27	44
	9	1	3	4	1	67	60	40	4	40	22	11	71	70	22	17	68	28	48
		2	1	1	1	6	8	5		5	5	1	3	4	3	6	2	2	8
							4									2	1	2	
			1	3		3	3	3	1		3	1	1	5	4	2	2	4	1
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				1		3			1	1			4		1	1			3
						2	1					1	5	6	1	1	3	1	1
1			1			2	2			1	1		3	1	2	2	3	1	1
				1			1	2	1	1			3	1		1	1	1	1
2						2	1							2	1			2	
4			1	2	1	13	10	8		8	14	2	17	15	5	10	2	6	8
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				1		4	4			2	1		1	4	1	4	1	2	
1		2	1	1	3	20	33	8	2	22	21	4	43	38	7	12	28	9	10
8		4	5	11	5	64	74	28	5	44	50	9	85	83	26	44	49	31	43
3	2	2	2	8	7	70	69	38	6	53	25	6	78	73	24	24	43	26	34
				1	1	7	2	1	1	8	2		6	8	4	2	5	1	10
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									1	1	1	1	2			1			

VITAL STATISTICS FOR

ANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DISTRICT—(*Con.*)										
OLEAN	10,163	9	11.0	3	2	1	....	....	....	....
Salamanca	5,455	6	.....	2	0	0	1	....	....	....
DUNKIRK	15,250	21	20.0	4	5	2	1	....	....	....
JAMESTOWN	26,160	27	13.0	5	2	1	....	....	....	....
Westfield	2,823	2	.....	0	0	1	....	....	....	....
Fredonia	5,148	9	.....	1	0	4	....	....	....	....
Rest of District	244,500	316	15.3	37	5	121	3	3	....	....
Totals for the District	439,000	561	15.0	67	23	174	6	4	....	....
Totals for March, 1905	435,000	618	17.0	77	13	183	2	6	....	....
EAST CENTRAL DISTRICT.										
SYRACUSE	117,500	164	16.5	18	19	40	2	1	....	....
Baldwinsville	2,961	5	.....	0	1	1	....	....	....	....
DeWitt	6,252	6	.....	0	1	2	....	....	....	....
CORTLAND	11,272	12	13.0	1	0	4	....	....	....	....
Homer	2,536	6	.....	0	2	1	....	....	....	....
ONEIDA	8,420	11	15.5	1	0	4	....	....	....	....
Hamilton	3,614	6	.....	1	0	0	....	....	....	....
Cazenovia	3,557	11	.....	1	0	4	....	....	....	....
Canastota	3,244	14	.....	2	0	4	....	1	....	....
Norwich	7,115	9	.....	0	0	2	....	....	....	....
Oneonta	8,054	16	.....	1	0	1	....	2	....	....
Worcester	2,328	5	.....	1	0	2	....	....	....	....
Cooperstown	2,446	4	.....	0	0	2	....	....	....	....
Walton	5,000	7	.....	0	0	2	....	....	....	....
Sidney	4,319	3	.....	0	0	2	....	....	....	....
Liberty	5,483	12	.....	3	1	3	....	....	....	....
Rest of District	220,100	323	17.3	32	10	117	1	3	....	....
Totals for the District	414,200	614	17.5	61	34	191	3	7	....	....
Totals for March, 1905	414,500	703	19.6	86	24	232	8	4	1	....
VEST CENTRAL DISTRICT.										
AUBURN	31,422	49	14.6	3	2	13	....	....	....	....
ITHACA	14,615	17	13.5	2	1	3	....	....	....	....
Hector	3,888	2	.....	0	0	1	....	....	....	....
Waterloo	4,123	9	.....	0	2	3	....	....	....	....
Seneca Falls	6,733	7	.....	1	0	2	....	....	....	....
GENEVA	12,249	17	16.5	0	0	6	....	....	....	....
Canandaigua	7,332	10	.....	0	0	2	....	....	....	....
Manchester	4,809	11	.....	1	0	0	....	....	....	....
Phelps	4,757	2	.....	0	0	1	....	....	....	....
Penn Yan	4,504	8	.....	0	0	3	....	....	....	....
Batavia	10,080	11	.....	0	0	6	....	....	....	....
Dansville	3,908	5	.....	0	1	1	....	....	....	....
Le Roy	3,400	6	.....	0	0	5	....	....	....	....
Warsaw	4,469	4	.....	0	0	1	....	....	....	....
Rest of District	199,400	300	17.5	21	8	133	....	3	....	....
Totals for the District	315,700	458	17.0	28	14	190	....	3	....	....
Totals for March, 1905	320,600	545	20.0	47	16	223	3	3	....	....

March, 1906 — (*Continued*).

Diseases.						Other Causes of Death.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal under 5 years).	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
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3	...	1	11	3	4	33	53	16	7	55	26	8	80	74	23	39	47	31	37
...	3	6	...	4	2	41	92	40	9	40	19	7	82	80	23	33	47	29	53
2	2	...	4	2	...	13	14	11	3	9	9	1	19	18	6	4	22	10	12
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...	3	2	...	4	5	26	30	17	3	25	16	2	55	40	15	9	36	11	20
2	5	3	6	8	6	57	56	33	6	42	35	4	88	76	27	21	64	27	38
13	5	7	2	5	3	55	85	31	6	45	36	8	112	88	33	30	51	31	44
...	...	...	...	1	1	3	13	3	...	3	2	1	4	7	4	2	2	2	1
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1	...	...	...	...	...	...	3	...	...	3	...	...	1	...	...	1	1	1	...
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2	...	1	2	...	2	14	23	9	4	24	10	4	54	56	10	13	41	10	18
4	...	1	2	2	4	26	49	13	5	39	15	6	75	82	22	17	54	16	23
1	3	1	...	4	1	32	62	31	4	32	44	3	81	81	33	24	58	20	24

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES.			EPIDEMIC			
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Cerebro-spinal meningitis.	Typhoid fever	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT.										
BUFFALO	376,587	505	15.8	92	46	70	4	5	....	....
TONAWANDA	7,904	2	.....	1	0	0	....	....	....	....
Amherst	4,500	6	.....	2	0	1	....	....	....	....
NORTH TONAWANDA	10,197	14	16.0	2	1	2	....	....	....	....
LOCKPORT	17,552	15	11.0	4	1	3	....	....	....	....
NIAGARA FALLS	26,560	34	15.1	7	3	4	....	3	....	....
Medina	5,114	3	.....	0	0	0	....	....	....	....
Albion	5;174	4	.....	0	0	2	1	....	....	....
Brockport	3,627	4	.....	1	0	1	....	....	....	....
ROCHESTER	181,666	238	15.4	22	15	48	3	....	....	....
Palmyra	4,042	6	.....	0	0	2	....	....	....	....
Newark	4,554	13	.....	1	0	6	....	....	....	....
Lyons	4,758	9	.....	1	0	2	....	....	....	....
Clyde	2,552	4	.....	1	0	0	....	....	....	....
OSWEGO	22,572	35	18.5	2	2	8	....	1	....	....
FULTON	8,847	10	14.0	1	1	3	....	....	....	....
Richland	3,611	4	.....	1	0	2	....	....	....	....
Rest of District	257,500	289	13.0	19	15	107	2	2	....	....
Totals for the District	947,500	1,195	15.0	157	84	261	10	11	....	....
Totals for March, 1905	945,200	1,332	16.5	209	75	365	12	14	....	....
Totals for the State	8,198,500	12,854	18.6	1,973	1,316	2,300	153	84	7	....
Average past five years	....	12,245	19.1	2,083	1.130	2,332	148	127	9	19
Totals for March, 1905	7,918,000	13,135	19.6	2,051	1,138	2,529	490	97	5	1

THE SANITARY DISTRICTS into which the State is divided are as follows: *Maritime District:* Includes Greater New York, Long Island (Nassau and Suffolk counties) and Westchester county. *Hudson Valley District:* All the counties on either side of the Hudson river except Westchester, to and including Albany and Rensselaer. *Adirondack and Northern District:* The Northern section of the State—the counties of Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis. *Mohawk Valley District:* Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer

MARCH, 1906 — (*Concluded*).

Diseases.						Other Causes of Death.													
Scarlet fever.	Measles.	Erysipelas	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
3	1	3	2	14	13	42	64	24	8	30	20	12	51	69	27	32	18	23	40
						1													1
											1		1	1			1	1	1
						1	2	1		3	1		1	1	1	1		1	1
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						1				1			1						
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			3	7	5	18	26	18		22	10	6	45	31	11	20	32	12	19
4	1	3	6	31	26	100	137	66	11	82	60	18	149	155	50	77	71	49	78
10	20	6	10	24	16	107	152	83	16	76	67	26	146	157	79	61	95	67	88
75	243	48	68	314	214	1,387	2,044	446	141	699	826	166	1,398	1,233	494	636	496	618	1,069
138	121	54	70	247	215	1,322	1,400	900	130	670	747	200	1,262	1,262	465	535	541	558	1,107
106	130	64	66	208	230	1,382	1,737	515	145	698	817	172	1,418	1,349	542	621	535	557	1,250

and Oneida counties. *Southern Tier District:* The seven counties along the southern border of the State. *East Central District:* Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties. *West Central District:* Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties. *Lake Ontario and Western District:* Oswego, Wayne, Monroe, Orleans, Niagara, and Erie counties.

VITAL STATISTICS

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns in

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES.			EPIDEMIC			
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT.										
City of New York	4,152,860	6,686	19.5	1,292	915	620	127	32	3	1
BOROUGH OF MANHATTAN	2,174,335	3,600	20.6	788	486	298	93	21	1	....
BOROUGH OF THE BRONX	290,097	552	23.2	81	86	58	9	4	1	....
BOROUGH OF BROOKLYN	1,404,569	2,082	18.1	358	313	214	25	6	....	1
BOROUGH OF QUEENS	209,685	265	15.4	52	23	32	....	1	1	....
BOROUGH OF RICHMOND	74,173	97	16.8	13	7	18	....	....	....	....
Oyster Bay	20,545	28	....	5	0	10	....	....	....	....
Hempstead	34,746	38	....	7	4	11	....	....	....	....
North Hempstead	14,163	23	....	2	2	4	....	....	....	....
Southold	8,989	4	....	1	0	1	....	....	....	....
Sag Harbor	3,048	2	....	0	0	0	....	....	....	....
Huntington	10,236	10	....	0	0	6	....	....	....	....
Brookhaven	16,050	16	....	3	0	6	....	....	....	....
YONKERS	61,716	95	18.7	21	15	9	1	....	....	....
Greenburgh	18,635	25	....	9	2	1	....	....	....	....
MOUNT VERNON	25,006	35	17.1	6	6	4	1	....	....	....
Port Chester	11,200	13	....	3	2	2	....	1	....	....
Ossining	7,135	17	....	2	3	5	....	....	....	....
NEW ROCHELLE	20,480	42	25.0	11	9	3	....	1	....	....
Peekskill	13,200	22	....	3	3	4	....	....	....	....
White Plains	11,579	14	....	2	2	4	....	....	....	....
Mamaroneck	5,090	....	....	....	....	....	....	....	....	....
Rest of District	98,262	187	13.0	17	8	36	1	....	....	....
Totals for the District	**4,523,940**	**7,257**	**19.5**	**1.384**	**971**	**726**	**130**	**34**	**3**	**1**
Totals for April, 1905	**4,273,767**	**7,192**	**21.0**	**1,324**	**871**	**740**	**469**	**46**	**6**	**1**
HUDSON VALLEY DISTRICT.										
ALBANY	100,000	157	19.3	18	13	28	11	1	1	....
COHOES	24,183	34	17.3	5	3	5	....	1	....	....
TROY	76,910	115	17.8	15	3	13	1	3	1	....
WATERVLIET	14,600	18	15.0	4	1	3	....	....	....	....
Green Island	4,878	7	....	1	0	3	....	....	....	....
Hoosick Falls	5,251	11	....	1	0	2	....	....	....	....
RENSSELAER	10,715	17	19.0	3	3	3	....	....	....	....
Coxsackie	4,317	5	....	0	0	0	....	1	....	....
Catskill	5,294	10	....	1	0	5	....	....	....	....
HUDSON	10,290	15	17.5	0	1	3	1	1	....	....
KINGSTON	25,556	39	16.5	2	2	10	....	....	....	....
Ellenville	2,872	3	....	1	0	0	....	....	....	....
Marbletown	3,000	5	....	0	0	3	....	....	....	....
Rosendale	4,670	5	....	1	0	0	....	....	....	....
Esopus	4,786	2	....	0	0	1	....	....	....	....
Saugerties	3,833	4	....	0	0	2	....	....	....	....
POUGHKEEPSIE	25,379	39	18.7	3	5	13	....	1	....	....
Fishkill	13,183	20	....	1	2	2	....	....	....	....
Wappingers Falls	3,588	7	....	0	1	2	....	....	....	....
NEWBURG	26,500	37	17.0	3	0	9	....	1	....	....
Port Jervis	9,700	15	....	3	2	2	....	....	....	....
MIDDLETOWN	14,516	26	21.1	3	3	3	....	....	....	....
Warwick	6,690	8	....	1	0	1	....	....	....	....
Goshen	5,023	9	....	2	0	2	....	....	....	....
Montgomery	6,652	11	....	0	0	5	....	....	....	....
Haverstraw	10,482	12	....	1	2	1	....	....	....	....
Nyack	4,441	....	....	....	....	....	....	....	....	....
Ramapo	10,142	25	....	6	0	6	....	....	....	....
Rest of District	268,000	422	19.6	44	14	131	8	3	....	....
Totals for the District	**705,500**	**1,078**	**18.4**	**119**	**55**	**258**	**16**	**12**	**2**	**....**
Totals for April, 1905	**696,000**	**1,101**	**19.3**	**139**	**89**	**269**	**20**	**17**	**....**	**....**

FOR APRIL, 1906.

Roman type; Populations estimated to date printed in full faced figures.

Diseases.						Other Causes of Death.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal under 5 years).	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
54	212	33	18	185	162	774	1,293	142	62	265	465	90	636	487	252	364	75	335	609
17	98	22	11	95	83	398	729	62	38	145	248	52	368	258	143	199	27	208	374
2	29	1		21	14	113	95	11	5	14	24	5	43	44	18	34	8	25	32
42	79	10	6	61	53	219	413	61	17	88	160	29	180	153	78	99	30	89	183
2	4		1	6	11	27	41	7	1	11	26	4	35	23	7	28	7	10	12
1	2			2	1	17	15	1	1	7	7		10	9	6	4	3	3	8
			2			2	2		1	1	2		4	4	4		2	1	3
	2					4	5	2		2	1	1	5	5	6	1	1		3
							4			2	2	1	2	2	1	4	1	1	3
						1							1	1					1
						2													
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				1		2	1	1	1		2		1	1		1	3	1	1
		3	1	3	4	10	21	4	2	7	7	3	5	9	3	3	2	2	5
1	1	1	2	1	3	2		1		1	2		1	4		1		2	2
		1			1	1	5	1		2	7	1	3	2		3	1	1	5
						1	2	1	1	1	1		1				1	1	2
	2						3	1		2	1		3		2	1	1		1
1			4	1		4	8	4		1	2	1	2	6	1	3		2	1
	3		1		1	5	1			2			1	4		1	2	1	
							1	2		1	2		1	2		2	1	1	1
1			1	2	2	22	18	15	1	8	8		36	34	9	7	6	5	11
67	220	38	29	193	173	830	1,366	174	68	295	502	98	704	563	279	393	96	353	648
53	54	39	64	168	161	863	1,112	189	82	290	483	108	683	566	275	362	77	284	758
	1	1	1	2		24	20	3		5	19	1	23	13	10	5	7	7	2
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				1		22	10	6	1	9	7		20	14	2	2	3	1	12
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							4	1		1	1		1	3	1		1		
						7	8			1	1		6	4	2	2	5	2	1
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	5					2	2	2						9					
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						7	2	2		2	2	1	2	6	4		2	2	4
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			1		1	4	2	2		1			1	1	1	3	1	2	6
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						1	1			2	2				1		3		1
	1			1		1	2			1	1			2	2		1		
			2			9	2	1					1	4	2	2			2
		3	2	5	2	25	64	12	4	22	23	8	70	57	17	27	30	13	32
1	7	4	7	12	6	125	141	43	6	60	70	12	146	143	51	48	60	32	74
11	33	1	7	13	12	106	127	48	12	79	69	10	120	137	44	55	49	50	81

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES.			EPIDEMIC			
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
ADIRONDACK AND NORTHERN DISTRICT.										
WATERTOWN	25,447	50	24.0	7	4	12	....	1	....	....
Ellisburgh	3,740	7	.....	0	0	3	....	....	....	....
Carthage	3,404	7	.....	0	2	1	....	....	....	....
Clayton	4,100	3	.....	1	0	1	....	....	....	....
OGDENSBURGH	13,179	29	26.5	2	0	6	....	1	1	....
Gouverneur	6,582	5	.....	1	0	0	....	2	....	....
Potsdam	4,162	10	.....	1	0	5	....	....	....	....
Canton	6,800	11	.....	0	3	2	1	....	....	....
Malone	6,478	11	.....	0	2	4	....	....	....	....
PLATTSBURG	10,184	3	.....	0	0	3	....	....	....	....
Glens Falls	14,650	29	24.0	3	3	4	....	....	....	....
Whitehall	4,148	3	.....	0	0	1	....	1	....	....
Fort Edward	5,300	10	.....	1	1	4	....	....	....	....
Sandy Hill	5,321	6	.....	2	1	0	....	....	....	....
Granville	6,487	7	.....	1	1	2	....	....	....	....
Greenwich	4,338	8	.....	0	2	2	....	....	....	....
Lowville	3,921	7	.....	2	0	2	....	....	....	....
Rest of District	279,800	360	14.5	42	20	101	2	2	....	....
Totals for the District	408,100	566	16.5	63	39	153	3	7	1	....
Totals for April, 1905	400,000	489	15.0	86	24	134	3	8	....	....
MOHAWK VALLEY DISTRICT.										
SCHENECTADY	58,387	84	17.6	19	6	14	....	....	....	....
Cobleskill	3,731	8	.....	1	1	3	....	....	....	....
AMSTERDAM	23,943	30	15.3	5	3	6	....	....	....	....
Fort Plain	2,600	......	.....	......	......	......	....	....	....	....
JOHNSTOWN	9,845	13	16.0	1	0	4	....	1	....	....
GLOVERSVILLE	18,672	22	14.5	0	1	7	....	....	....	....
LITTLE FALLS	11,122	11	11.0	0	1	4	....	....	....	....
Herkimer	6,600	6	.....	0	0	3	....	....	....	....
Ilion	5,924	9	.....	1	0	3	....	....	....	....
UTICA	62,934	111	21.4	18	10	21	....	....	....	....
Whitestown	6,895	8	.....	0	0	4	....	....	....	....
ROME	16,562	29	20.0	2	3	14	....	....	....	....
Boonville	3,167	1	.....	0	0	0	....	....	....	....
Camden	3,750	7	.....	1	1	3	....	....	....	....
Waterford	6,000	9	.....	1	1	2	....	....	....	....
Mechanicville	5,877	11	.....	2	0	1	....	....	....	....
Ballston Spa	4,131	5	.....	0	0	2	....	....	....	....
Saratoga Springs	13,000	19	17.5	1	2	6	....	....	....	....
Rest of District	181,600	256	17.1	13	5	100	1	2	....	....
Totals for the District	444,740	639	17.6	65	34	197	1	3	....	....
Totals for April, 1905	433,640	572	16.0	66	27	188	12	5	....	....
SOUTHERN TIER DISTRICT.										
BINGHAMTON	42,036	47	13.6	8	1	11	....	....	....	....
Owego	5,010	9	.....	2	0	6	....	....	....	....
Candor	3,148	3	.....	0	0	1	....	....	....	....
Waverly	4,915	9	.....	1	0	3	....	....	....	....
ELMIRA	34,687	29	10.2	3	0	7	....	....	....	....
Horseheads	4,826	8	.....	0	0	3	....	....	....	....
HORNELLSVILLE	13,259	14	13.0	1	0	5	....	....	....	....
Bath	3,700	4	.....	0	0	4	....	....	....	....
CORNING	13,515	18	16.0	5	2	4	....	....	....	....
Wellsville	4,355	4	.....	0	0	1	....	....	....	....

APRIL, 1906 — (*Continued*).

Diseases.						Other Causes of Death													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
				1		2	10	2		4	3		10	4	4	1		1	7
										1			2	1			2	1	
						1	2	1	1	2									
														1	1				1
						1	2	2		2	4		6	2	2		5		1
													1			2			
																2	3	4	1
						1	3			3	1		1			1			
						2	2			1				1	2	1	2		
														2			1		
				1		1	2	2		2	1		3	3	4	4		3	3
											1							1	
				1		1	1	1		2			1				2		1
			1							1			1	3					
			1			2	1				1			1					1
						1	1	1		1	1		1			1		1	
						1				1			1	1		1			2
2	2	2	..	3	1	54	43	11	4	25	12	3	45	31	14	24	32	18	30
2	2	2	2	6	1	67	67	20	5	45	24	3	72	50	27	37	47	29	47
...	7	...	2	2	4	51	55	19	10	45	30	5	45	49	19	17	31	30	57
		1		1		6	9	4		8	2		16	8	4	4	5	5	11
						3		1			1			1			2		
			1	2		2	5	3		1	1		2	3	3	1	2	1	3
						3							2	1	1		2	2	1
						2	4	1		1	1		5	2		1	3	2	
			1			1	4	1					1	1	1		1		
				1		1	1						1	1			1		
		1				1					2			1		2	1	1	
4	2		3		1	8	9	5		6	14	3	11	13	7	5	3	8	9
		1					1	1	1				1	1		1		1	
						1	5	1	1		1		5	3		4	6	1	1
																1			
						2	1						1	1			2		
						2					2			5					
						1				2	1		1	2		2		1	1
							2				2	1							
2				1			3	1		1	1		3	3	1		1		2
2		2	3	2		26	28	9	1	19	19	6	35	33	15	5	25	11	12
8	2	5	8	7	1	59	72	27	3	38	47	10	84	79	32	26	54	33	40
....	3	1	2	5	6	51	62	26	2	29	41	9	79	67	30	31	38	31	42
						6	4	2		7	5		4	7	8	1	4	1	3
							2	1					1	1			1	1	2
														3					
1						2								2		1	2		1
						5	1	1			2		4	3	3	1	2	3	4
						1					1		3		1	1	1		
						1				2			3	4	1	1	1		1
							2			1				1					
						1	2	1		1	3	1		1		2		1	5
											1		1		1			1	

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES.			EPIDEMIC			
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DISTRICT—(*Con.*).										
OLEAN	10,163	10	13.0	1	1	0	....	....	....	....
Salamanca	5,455	7	....	1	1	2	....	....	....	....
DUNKIRK	15,250	25	19.2	9	3	4	2	....	....	....
JAMESTOWN	26,160	22	10.2	3	0	7	....	....	....	....
Westfield	2,823	5	....	2	0	2	....	....	....	....
Fredonia	5,148	8	....	1	0	3	....	....	....	....
Rest of District	244,500	314	15.7	36	9	117	4	3	....	....
Totals for the District	439,000	536	15.0	73	17	180	6	3	....	....
Totals for April, 1905	435,000	586	16.3	59	17	193	3	7	....	....
EAST CENTRAL DISTRICT.										
SYRACUSE	117,500	164	17.0	20	17	26	....	....	....	....
Baldwinsville	2,961	1	....	1	0	0	....	....	....	....
DeWitt	6,252	9	....	4	0	2	....	....	....	....
CORTLAND	11,272	4	....	0	0	1	....	....	....	....
Homer	2,536	1	....	0	0	0	....	....	....	....
ONEIDA	8,420	17	....	3	1	3	....	....	....	....
Hamilton	3,614	5	....	2	0	3	....	....	....	....
Cazenovia	3,557	6	....	0	0	4	....	....	....	....
Canastota	3,244	8	....	3	0	2	....	....	....	....
Norwich	7,115	11	....	1	1	2	....	....	....	....
Oneonta	8,054	12	....	2	0	3	....	....	....	....
Worcester	2,328	....	....	....	....	....	....	....	....	....
Cooperstown	2,446	2	....	0	0	1	....	....	....	....
Walton	5,000	5	....	0	0	3	....	....	....	....
Sidney	4,319	1	....	0	0	0	....	....	....	....
Liberty	5,483	18	....	2	1	3	....	....	....	....
Rest of District	220,100	324	17.6	31	9	130	3	4	....	....
Totals for the District	414,200	588	17.2	69	29	181	3	4	....	
Totals for April, 1905	414,500	547	16.0	41	24	181	8	1	4	....
WEST CENTRAL DISTRICT.										
AUBURN	31,422	52	20.0	4	2	17	....	....	....	....
ITHACA	14,615	19	15.2	3	1	5	....	....	....	....
Hector	3,888	8	....	0	0	2	....	....	....	....
Waterloo	4,123	3	....	1	0	1	....	....	....	....
Seneca Falls	6,733	9	....	3	1	3	....	....	....	....
GENEVA	12,249	12	12.0	2	0	4	....	....	....	....
Canandaigua	7,332	14	....	1	1	5	....	....	....	....
Manchester	4,809	8	....	0	0	6	....	....	....	....
Phelps	4,757	6	....	1	0	1	....	....	....	....
Penn Yan	4,504	15	....	1	0	3	....	....	....	....
Batavia	10,080	11	....	2	0	5	....	....	....	....
Dansville	3,908	2	....	0	0	1	....	....	....	....
Le Roy	3,400	7	....	0	1	0	....	....	....	....
Warsaw	4,469	2	....	0	1	0	....	....	....	....
Rest of District	199,400	240	14.5	26	7	99	....	1	....	....
Totals for the District	315,700	408	15.6	44	14	151	....	1	....	....
Totals for April, 1905	320,600	500	18.7	53	13	192	5	2	....	....

APRIL, 1906 — (*Continued*).

DISEASES.						OTHER CAUSES OF DEATH.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
	1					2	1			1	1		1	1	1	1			
			1			1	1				1						1	1	1
	1		2	1			2	2		3	1		1	4		1	2		3
				1		3	2	1			1		4		2	1	2	1	4
			1				1			1							1		1
						1	1	1					3				1		1
			2	2	3	20	27	10	2	18	21	5	52	55	15	13	29	10	23
1	2		6	4	3	43	46	19	2	34	37	6	77	82	27	23	47	19	49
1	2	2	1	4	6	44	51	21	3	47	43	20	87	70	34	37	42	20	41
4	3		2	3	4	19	20	12	1	12	8	6	25	13	5	3	3	10	11
								1											
						2	1						3						3
								1			1		1		1				
											1								
			1				3			1	2		2	3		2	1	1	1
													1	1		1			2
											1		1	3			1		
						1	1	2					1					1	2
				1			1	1		3	1			1		1		1	1
								1			2		1	2		5			1
											1		1						
										1	1			1	1			1	
																1			
			1			6	4	1		2			2					1	1
2	4		3	1	3	31	35	14		23	10	5	44	42	12	21	35	14	18
6	7		7	5	7	59	63	35	1	42	28	11	82	66	19	34	40	29	40
6	3	2	3	4	5	62	46	13	6	29	33	4	84	74	32	26	48	25	28
					2	5	7	2	2		2	1	7	9	5	1	4	4	1
					1	2	2		1	3	1		2	1	1	1	2		2
						1				1	1		2	1	1				1
						1							1						1
						1	2	1							1		1		3
						1	1		1		1		3	2		1	1		1
					1	2	2			1	1			2		1	1	2	1
										2	1		1	3				1	
							3					1	1					1	
						1		1	2		1		4	3	1		1		1
						1	1	2			1		2		1	1			2
														1				1	
				1		3				1			1		1				
							1								1				
		1	4	1		17	21	7		11	7	4	47	44	15	11	20	10	19
		1	4	2	4	35	40	13	6	19	16	6	71	66	27	16	30	19	32
	3	4	3	5		34	53	19	4	34	22	2	75	76	21	25	41	29	42

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Representing annual death rate per 1,000 population of—	AGES.			EPIDEMIC			
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT.										
BUFFALO	376,587	489	15.8	97	48	61	4	4	....	....
TONAWANDA	7,904	7	....	2	1	0	....	....	....	....
Amherst	4,500	7	....	1	0	2	....	....	....	....
NORTH TONAWANDA	10,197	9	10.0	1	2	1	....	....	....	....
LOCKPORT	17,552	23	15.5	4	2	4	....	2	1	....
NIAGARA FALLS	26,560	36	16.5	13	2	6	....	3	....	....
Medina	5,114	6	....	1	1	2	....	....	....	....
Albion	5,174	4	....	1	0	0	....	....	....	....
Brockport	3,627	7	....	1	2	2	....	....	....	....
ROCHESTER	181,666	288	19.2	39	22	63	10	2	....	....
Palmyra	4,042	3	....	0	1	1	....	....	....	....
Newark	4,554	7	....	0	0	2	....	....	....	....
Lyons	4,758	11	....	3	1	0	....	....	....	....
Clyde	2,552	6	....	1	0	3	....	....	....	....
OSWEGO	22,572	39	21.5	6	1	8	....	....	....	....
FULTON	8,847	16	21.5	4	0	6	....	....	....	....
Richland	3,611	5	....	1	0	0	....	....	....	....
Rest of District	257,500	325	15.3	50	15	116	3	4	....	....
Totals for the District	947,500	1,288	16.5	225	96	277	17	15	1	....
Totals for April, 1905	945,200	1,342	17.3	181	225	346	11	13	....	....
Totals for the State	8,198,500	12,360	18.5	2,041	1,257	2,121	176	79	7	1
Average past five years	....	11,920	18.8	2,051	900	2,157	179	106	10	22
Totals for April, 1905	7,918,000	12,329	19.0	1,949	1,290	2,234	531	99	10	1

THE SANITARY DISTRICTS into which the State is divided are as follows: *Maritime District:* Includes Greater New York, Long Island (Nassau and Suffolk counties) and Westchester county. *Hudson Valley District:* All the counties on either side of the Hudson river except Westchester, to and including Albany and Rensselaer. *Adirondack and Northern District:* The Northern section of the State—the counties of Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis. *Mohawk Valley District:* Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer

APRIL, 1906 — (*Concluded*).

DISEASES.						OTHER CAUSES OF DEATH.													
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Bright's disease.	Diseases of urinary system (other than Bright's disease).	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified
2	2	...	7	11	21	60	26	47	15	30	22	9	57	45	26	35	13	20	33
....	1	...	...	....	....	2	......	1	....	......	....	......	1	......	....	....	....	......	2
....	...	...	...	....	....	1	......	1	....	......	....	......	1	2	....	1	....	......	1
....	2	...	...	....	....	2	1	......	....	1	1	......	1	......	....	....	....	1	......
....	...	...	...	2	....	......	2	1	....	......	2	......	2	3	....	....	3	2	3
....	...	...	...	2	4	3	8	1	....	3	1	......	1	2	....	....	1	......	7
....	...	...	...	....	....	......	1	......	....	......	....	1	......	2	....	1	....	......	1
....	...	...	...	....	....	......	......	......	....	......	1	......	1	......	....	1	....	1	......
....	...	...	1	....	....	......	1	......	....	......	1	......	2	......	....	....	2	......	......
4	...	1	...	11	2	27	18	18	2	26	29	1	32	33	16	7	9	15	25
....	...	...	...	....	....	......	......	1	....	1	....	......	......	1	....	....	....	......	..
....	...	...	...	....	....	3	1	......	....	1	....	......	2	......	....	....	....	......	......
1	...	...	...	....	1	2	1	......	....	......	1	......	1	1	....	1	....	......	2
....	...	...	...	....	....	1	1	......	....	......	1	......	2	......	....	....	....	......	1
....	...	...	1	2	1	8	......	......	1	2	....	......	4	4	3	2	4	1	6
....	...	...	...	....	....	......	1	1	....	4	....	......	2	2	....	1	2	1	2
....	...	...	...	....	....	......	......	......	....	......	1	......	1	......	2	....	....	......	1
1	3	1	2	6	2	22	31	16	4	17	8	3	34	42	18	21	38	16	33
8	8	2	11	34	31	131	92	87	22	85	68	14	144	137	65	70	72	57	117
3	48	3	10	19	21	129	82	100	25	68	56	23	176	161	72	69	91	66	96
93	248	52	74	263	226	1,349	1,887	418	113	618	792	160	1,380	1,186	527	647	446	571	1,047
154	130	56	73	265	225	1,291	1,313	800	121	643	604	315	1,269	1,265	458	572	465	584	1,000
74	153	52	92	220	215	1,340	1,588	435	144	621	818	141	1,349	1,200	527	622	417	535	1,145

and Oneida counties. *Southern Tier District:* The seven counties along the southern border of the State. *East Central District:* Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties. *West Central District:* Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties. *Lake Ontario and Western District:* Oswego, Wayne, Monroe, Orleans, Niagara, and Erie counties.

VITAL STATISTICS

Cities are printed in SMALL CAPITALS, Villages in *Italics* and Towns in

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
MARITIME DISTRICT.*													
City of New York													
BOROUGH OF MANHATTAN	2,174,335	3,510	19.4	675	480	294	16	...	...	63	27	15	102
BOROUGH OF THE BRONX	290,097	541	22.4	60	79	46	1	...	...	33	12	4	17
BOROUGH OF BROOKLYN	1,404 569	2,204	18.8	385	322	228	14	4	2	61	72	7	89
BOROUGH OF QUEENS	209,685	286	16.4	59	34	38	2	2	...	4	5	...	6
BOROUGH OF RICHMOND	74,173	107	17.3	7	6	23	...	...	...	2	1	1	2
Totals	4,152,860	6,648	19.2	1,186	921	629	33	6	2	163	117	27	216
Oyster Bay	20,545	19	....	4	1	8	...	...	...	...	...	...	...
Hempstead	34,746	36	....	5	4	14	...	...	...	1	...	...	...
North Hempstead	14,163	12	....	1	0	5	...	...	...	...	...	...	...
Southold	8,989	3	....	0	0	3	...	...	...	...	...	...	...
Sag Harbor	3,048	2	....	0	0	0	...	...	...	...	...	...	...
Huntington	10,236	21	....	5	0	6	...	...	...	...	...	1	1
Brookhaven	16,050	31	....	6	2	15	...	...	...	...	...	...	...
YONKERS	61,716	102	19.9	16	12	27	...	...	...	...	3	...	5
Greenburgh	18,635	21	....	2	1	6	...	...	...	...	...	...	...
MOUNT VERNON	25,006	39	18.7	4	5	14	...	...	...	1	...	...	...
Port Chester	11,200	11	....	2	2	2	...	...	...	...	...	...	...
Ossining	7,135	15	....	2	2	10	...	...	...	...	...	...	...
NEW ROCHELLE	20,480	41	24.0	8	8	8	1	...	...	...	...	1	...
Peekskill	13,200	16	....	5	4	5	...	...	...	...	...	...	...
White Plains	11,579	16	....	0	3	5	...	...	...	...	...	...	...
Mamaroneck	5,090	6	....	4	1	1	...	...	...	...	...	...	...
Rest of District	98,262	158	19.3	12	10	64	...	...	...	...	...	...	1
Totals for the District	4,523,940	7,197	19.1	1,262	976	822	34	6	2	165	120	29	223
Totals for May, 1905	4,273,767	6,453	18.0	1,189	786	636	34	8	2	69	64	45	152
HUDSON VALLEY DISTRICT.†													
ALBANY	100,000	159	19.0	13	6	53	...	...	...	...	...	1	...
COHOES	24,183	24	11.9	8	2	9	...	...	...	...	...	1	...
TROY	76,910	143	22.3	20	5	49	...	...	...	...	1	...	2
WATERVLIET	14,600	24	19.7	6	5	5	2	...	...	1	...	...	...
Green Island	4,878	5	....	0	0	0	...	...	...	...	...	...	2
Hoosick Falls	5,251	6	....	0	0	4	...	...	...	...	...	...	...
RENSSELAER	10,715	16	17.9	2	2	5	1	...	...	...	...	...	1
Coxsackie	4,317	8	....	0	0	3	...	...	...	...	...	...	...
Catskill	5,294	3	....	0	0	2	...	...	...	...	...	...	...
HUDSON	10,290	13	15.2	2	2	4	...	...	...	...	...	...	...
KINGSTON	25,556	36	16.9	7	2	9	...	...	...	...	...	...	1
Ellenville	2,872	5	....	1	0	4	...	...	...	...	...	...	...
Marbletown	3,000	1	....	0	1	0	...	...	...	...	...	...	...
Rosendale	4,670	7	....	0	2	2	...	...	...	...	...	...	...
Esopus	4,786	7	....	0	0	3	...	...	...	...	...	...	...
Saugerties	3,833	1	....	0	0	0	...	...	...	...	...	...	...
POUGHKEEPSIE	25,379	38	18.0	3	2	18	...	...	...	...	...	...	...
Fishkill	13,183	13	....	3	1	2	...	...	...	...	...	...	...
Wappingers Falls	3,588	4	....	2	0	2	...	...	...	...	...	...	...
NEWBURG	26,500	37	16.7	1	3	8	...	...	...	1	...	...	...
Port Jervis	9,700	20	....	3	1	8	...	...	...	...	...	1	...
MIDDLETOWN	14,516	27	22.3	3	2	11	...	...	...	...	...	1	...
Warwick	6,690	2	....	0	0	1	...	...	...	...	1	...	...
Goshen	5,023	10	....	0	0	5	...	...	...	...	...	...	...
Montgomery	6,652	7	....	3	0	4	...	...	...	...	...	...	...

* Includes Greater New York, Long Island [Nassau and Suffolk counties] and Westchester county.

† Includes Rockland, Putnam, Orange, Dutchess, Ulster, Greene, Columbia, Albany and Rensselaer counties.

FOR MAY, 1906.

Roman type; Populations estimated to date printed in full faced figures.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system).	Diarrhea and enteritis (under 2 years.)	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	Puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
...	25	...	85	395	121	563	247	340	610	51	102	154	227	55	41	...	...	...	...	33	238	...
...	4	...	8	127	23	49	35	31	58	7	12	19	52	5	3	...	...	...	...	3	38	...
...	15	...	25	241	78	306	161	184	312	44	79	120	178	26	15	...	...	...	...	40	131	...
...	...	...	2	20	8	38	28	28	45	5	14	12	28	2	7	...	...	...	...	10	20	...
...	...	...	2	10	2	11	11	16	14	...	...	6	8	1	2	...	...	...	...	1	17	...
...	44	...	122	793	232	967	482	599	1,039	107	207	311	493	89	68	...	...	...	...	87	444	...
...	...	...	...	2	2	3	1	2	2	1	...	1	...	1	...	...	...	...	3	...	1	...
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...	1	1	...	6	4	6	6	12	18	2	1	11	4	1	1	1	...	...	8	1	10	...
...	...	...	...	3	1	2	1	4	1	2	1	...	4	...	...	...	...	...	...	1	1	...
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1	1	...	...	16	6	2	24	42	13	12	...	10	12	1	1	...	...	...	5	2	7	2
3	48	1	125	836	252	995	551	683	1,087	144	209	350	530	101	73	2	2	...	40	104	479	8
...	47	...	368	807	241	862	621	585	889	144	167	284	426	97	78	...	...	...	...	72	391	...
...	...	...	3	18	15	11	27	19	16	5	...	13	19	1	2	...	...	...	...	5	4	...
...	...	...	1	2	1	1	1	2	2	1	...	1	1	1	...	...	...	...	6	1	2	...
1	1	...	...	23	6	2	19	18	14	10	1	11	10	2	...	2	...	...	11	3	5	1
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...	...	...	2	2	2	2	9	...	7	4	...	2	2	1	1	...	...	...	1	1	...	...
1	...	...	...	3	2	1	1	...	2	1	...	2	2	...	...	...	...	...	2	...	2	...
...	...	...	...	2	...	1	3	4	1	...	...	6	2	1	...	...	...	1	2	2	1	...
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VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	Ages. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Epidemic Dis Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
HUDSON VALLEY DIST. (*Con.*).													
Haverstraw	10,482	3	.....	0	0	0	...	...	...	...	...	...	...
Nyack	4,441	18	.....	2	1	8	...	...	...	...	...	...	...
Ramapo	10,142	13	.....	0	1	3	...	...	...	1	...	...	...
Rest of District	268,000	388	17.4	38	38	191	5	...	...	23	...	4	7
Totals for the District	705,500	1,088	17.7	117	76	413	8	...	...	26	2	8	13
Totals for May, 1905	696,000	1,023	18.0	98	56	251	13	1	...	15	2	5	10
ADIRONDACK AND NORTHERN DISTRICT.*													
WATERTOWN	25,447	43	20.3	5	3	11	...	...	...	...	...	...	1
Ellisburgh	3,740	7	.....	0	0	3	...	...	...	...	...	...	...
Carthage	3,404	2	.....	0	1	1	...	...	...	...	...	...	...
Clayton	4,100	4	.....	2	0	2	...	...	...	...	...	...	...
OGDENSBURGH	18,179	23	21.0	6	1	14	...	...	...	...	...	...	...
Gouverneur	6,582	13	.....	0	1	4	...	...	...	...	...	...	...
Potsdam	4,162	3	.....	0	0	2	...	...	...	...	...	...	...
Canton	6,800	10	.....	0	0	6	...	...	...	...	...	...	...
Malone	6,478	12	.....	1	3	5	...	...	...	4	...	...	1
PLATTSBURGH	10,184	6	7.1	0	1	4	...	...	...	...	...	...	1
Glens Falls	14,650	19	15.6	1	0	4	...	...	...	...	...	...	...
Whitehall	4,148	17	.....	1	1	8	2	...	...	...	...	...	...
Fort Edward	5,300	6	.....	0	0	1	...	...	...	...	...	...	...
Sandy Hill	5,321	7	.....	1	1	3	...	...	...	...	...	...	...
Granville	6,487	8	.....	1	0	5	...	...	...	...	...	...	...
Greenwich	4,338	7	.....	0	0	2	...	...	...	...	...	...	...
Lowville	3,921	5	.....	0	0	4	...	...	...	...	...	...	...
Rest of District	279,800	332	14.2	46	21	161	3	1	...	2	...	1	6
Totals for the District	408,100	524	15.4	64	33	240	5	1	...	6	...	1	9
Totals for May, 1905	400,000	483	14.0	63	25	152	12	...	...	13	2	6	2
MOHAWK VALLEY DISTRICT.†													
SCHENECTADY	58,387	71	14.6	14	5	19	...	...	...	...	...	...	2
Cobleskill	3,731	4	.....	1	0	2	...	...	...	...	...	...	...
AMSTERDAM	23,943	29	14.5	6	3	8	...	...	...	...	...	...	1
Fort Plain	2,600	1	.....	0	0	1	...	...	...	...	...	...	...
JOHNSTOWN	9,845	8	9.7	1	0	4	...	...	...	...	...	...	...
GLOVERSVILLE	18,672	23	14.8	3	0	8	...	...	...	...	...	...	1
LITTLE FALLS	11,122	16	17.3	3	1	6	...	...	...	...	...	...	...
Herkimer	6,600	7	.....	3	0	1	...	...	...	...	...	...	...
Ilion	5,924	5	.....	0	2	1	...	...	...	...	...	...	...
UTICA	62,934	107	20.4	17	11	39	1	...	...	1	2	1	...
Whitestown	6,895	7	.....	2	1	2	...	...	...	...	...	...	...
ROME	16,562	23	16.7	1	2	10	1	...	...	...	...	...	2
Boonville	3,167	9	.....	2	0	4	...	...	...	...	...	...	...
Camden	3,750	3	.....	0	0	3	...	...	...	...	...	...	...
Waterford	6,000	8	.....	1	0	2	1	...	...	...	...	...	...
Mechanicville	5,877	4	.....	1	0	3	...	...	...	...	...	...	...
Ballston Spa	4,131	5	.....	1	0	2	...	...	...	...	...	...	...
Saratoga Springs	13,000	29	26.8	2	3	9	...	...	...	...	2	...	1
Rest of District	181,600	224	14.9	21	8	127	...	...	...	...	...	...	2
Totals for the District	444,740	583	15.7	79	36	251	3	...	...	1	4	1	9
Totals for May, 1905	435,600	535	14.5	81	26	150	7	1	...	13	1	1	2

* Includes Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis counties.

† Includes Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties.

MAY, 1906 — (*Continued*).

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
						1						1	1									
				1	2	1	1	4		1		3		2					2		1	
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4	....	....	1	30	18	20	44	45	35	13	....	20	26	10	1	4	1	....	27	16	26	8
6	1	....	8	99	61	50	130	114	95	55	2	73	77	25	6	7	1	1	69	41	50	10
....	3	....	15	136	43	111	122	133	76	37	9	72	65	12	11	....	....	....	....	62	70	....
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5	3	....	1	38	11	11	39	47	23	10	1	19	13	5	6	3	....	1	36	27	17	3
6	4	....	5	60	19	18	59	69	49	20	1	28	24	8	8	3	....	1	47	38	26	9
....	3	....	4	55	26	62	60	62	28	15	3	29	21	6	4	....	....	....	....	44	26	....
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....	4	....	12	44	20	71	67	82	44	18	3	39	30	8	7	....	....	....	....	35	26	....

VITAL STATISTICS FO

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	Ages. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Epidemic Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.
SOUTHERN TIER DISTRICT.*												
BINGHAMTON	42,036	51	14.6	8	2	19	...	...	...	...	...	...
Owego	5,010	14	....	1	0	6	...	...	...	...	...	...
Candor	3,148	4	....	0	0	2	...	...	...	...	...	...
Waverly	4,915	8	....	3	0	3	...	...	...	...	...	...
ELMIRA	34,687	43	14.9	5	3	15	1	...	...	...	...	...
Horseheads	4,826	2	....	0	0	2	...	...	...	...	...	...
HORNELL	13,259	21	19.0	3	0	9	...	...	...	...	...	...
Bath	3,700	3	....	1	0	2	...	...	...	...	...	...
CORNING	13,515	16	14.2	1	0	7	...	...	...	...	...	...
Wellsville	4,355	10	....	1	0	3	...	...	...	...	...	...
OLEAN	10,163	10	11.8	1	1	4	...	...	...	...	...	...
Salamanca	5,455	4	....	1	0	2	...	...	...	...	...	...
DUNKIRK	15,250	23	18.1	4	3	9	...	...	...	...	1	...
JAMESTOWN	26,160	22	10.1	2	1	9	...	...	...	...	...	...
Westfield	2,823	1	....	0	0	0	...	...	...	...	...	...
Fredonia	5,148	7	....	0	0	3	...	...	...	...	...	...
Rest of District	244,500	309	15.2	26	9	189	4	...	...	...	...	
Totals for the District	439,000	548	15.0	57	19	294	5	...	...	...	1	
Totals for May, 1905	435,000	534	14.5	50	14	153	2	...	...	1	2	
EAST CENTRAL DISTRICT.†												
SYRACUSE	117,500	141	14.4	24	12	38	...	...	...	...	2	
Baldwinsville	2,961	4	....	1	0	3	...	...	...	...	...	...
DeWitt	6,252	7	....	3	0	2	...	...	...	...	...	...
CORTLAND	11,272	14	14.9	1	0	6	...	...	...	...	...	...
Homer	2,536	3	....	1	0	2	...	...	...	...	...	...
ONEIDA	8,420	11	15.7	1	1	4	...	...	...	...	...	...
Hamilton	3,614	11	....	1	1	8	...	...	...	...	...	
Cazenovia	3,557	5	....	0	1	4	...	...	...	...	...	
Canastota	3,244	9	....	0	0	4	...	...	...	...	...	...
Norwich	7,115	11	....	1	1	6	...	...	...	...	...	...
Oneonta	8,054	16	....	1	0	7	...	...	...	...	...	
Worcester	2,328	5	....	2	0	3	...	...	...	...	...	...
Cooperstown	2,446	1	....	0	0	1	...	...	...	...	...	...
Walton	5,000	1	....	0	0	1	...	...	...	...	...	...
Sidney	4,319	8	....	0	0	2	...	...	...	...	...	...
Liberty	5,483	19	....	2	2	2	...	...	...	...	...	...
Rest of District	220,100	263	14.3	18	4	152	2	...	...	3	2	...
Totals for the District	414,200	529	15.3	56	22	245	2	...	...	3	4	
Totals for May, 1905	414,500	514	14.5	64	24	167	4	...	...	7	9	
WEST CENTRAL DISTRICT.‡												
AUBURN	31,422	52	19.9	6	4	21	...	...	...	...	1	...
ITHACA	14,615	22	18.1	1	0	11	...	...	...	...	...	...
Hector	3,888	3	....	0	0	3	...	...	...	...	...	...
Waterloo	4,123	10	....	1	0	5	...	...	...	...	...	...
Seneca Falls	6,733	8	....	2	0	2	...	...	...	...	...	...
GENEVA	12,249	33	32.3	1	2	12	...	...	...	...	...	...
Canandaigua	7,332	15	....	1	0	7	...	...	...	...	...	...
Manchester	4,809	5	....	0	0	6	...	...	...	...	...	...

* Includes Chautauqua, Cattaraugus, Allegany, Steuben, Chemung, Tioga and Broome cou
† Includes Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counti
‡ Includes Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and W
ming counties.

May, 1906 — (*Continued*).

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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2	2	....	3	40	26	41	77	82	39	26	1	24	33	9	5	6	1	...	43	42	25	10
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2	1	....	4	40	32	22	76	77	33	19	....	38	29	14	2	....	....	...	46	41	33	2
	1	....	9	46	22	57	68	69	44	15	4	45	48	8	5	....	....	....	....	28	24	...
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VITAL STATISTICS F

SANITARY DISTRICTS	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES.			EPIDEMIC					
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.
WEST CENTRAL DIST.—(*Con.*).												
Phelps	4,757	2	.....	0	1	0	...	...	...	...	...	...
Penn Yan	4,504	7	.....	1	0	4	...	...	...	...	...	...
Batavia	10,080	19	.....	3	0	8	...	...	...	...	...	...
Dansville	3,908	9	.....	1	0	4	...	...	...	...	...	1
Le Roy	3,400	7	.....	1	2	2	...	...	...	...	...	...
Warsaw	4,469	5	.....	1	1	2	...	...	...	...	...	...
Rest of District	199,400	235	14.1	20	3	140	2	...	...	...	...	...
Totals for the District	315,700	432	16.4	39	13	227	2	...	...	...	1	1
Totals for May, 1905	320,600	398	14.5	32	14	144	4	1	...	6	...	...
LAKE ONTARIO AND WESTERN DISTRICT.*												
BUFFALO	376,587	495	15.8	80	44	66	3	2	...	2	1	3
TONAWANDA	7,904	7	.....	1	1	2	...	...	...	...	...	...
Amherst	4,500	3	.....	1	0	2	...	...	...	...	...	...
NORTH TONAWANDA	10,197	10	11.8	2	2	1	...	...	...	...	...	...
LOCKPORT	17,552	17	11.7	5	0	5	1	...	...	...	...	...
NIAGARA FALLS	26,560	32	14.5	8	2	8	1	...	...	...	...	1
Medina	5,114	11	.....	1	0	6	...	...	...	...	...	...
Albion	5,174	10	.....	3	0	3	...	...	...	...	...	...
Brockport	3,627	6	.....	3	0	3	...	...	...	...	...	1
ROCHESTER	181,666	265	17.5	24	15	102	1	...	...	2	...	...
Palmyra	4,042	3	.....	1	0	1	...	...	...	...	...	...
Newark	4,554	6	.....	0	0	4	...	...	...	...	...	...
Lyons	4,758	11	.....	0	3	2	1	...	...	...	2	...
Clyde	2,552	4	.....	1	0	2	...	...	...	...	...	...
OSWEGO	22,572	32	17.0	10	0	12	1	...	...	...	...	2
FULTON	8,847	8	10.9	1	0	5	...	...	...	...	...	...
Richland	3,611	4	.....	1	0	0	...	...	...	...	...	...
Rest of District	257,500	297	13.8	47	10	150	2	...	...	...	...	2
Totals for the District	947,500	1,221	15.4	109	33	308	10	2	...	4	3	9
Totals for May, 1905	945,200	1,195	15.0	155	156	270	11	...	...	28	9	14
Totals for the State	8,198,500	12,072	17.7	1,783	1,208	2,800	69	9	2	205	135	58
Average past five years	....	11,054	17.2	1,732	930	1,948	99	15	26	122	153	72
Totals for May, 1905	7,918,000	11,135	17.0	1,732	1,101	1,921	87	11	2	152	89	72

* Includes Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

MAY, 1906 — (*Concluded*).

EASES.																						
Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
								1						1								
						2		2					1				1		1			
				1	2	3		2		1		2	1	1					2		3	1
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3				14	10	8	39	42	13	9		17	8	5	2	2			17	27	15	2
3	1		3	31	21	25	63	71	28	18		25	20	16	4	3	1		28	30	31	4
	2		1	39	26	35	54	58	23	11	2	25	29	11	2					35	29	
	1		11	38	35	50	62	65	23	52	12	20	23	13	13					19	42	
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	1					2	2		1	2			2						3	1		1
				2	1	2	4	2	2	1		3	1	2				1	6		3	
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1	1	1	9	29	12	12	27	30	20	14		19	21	6	2	1		1	16	15	16	2
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2	2		4	22	22	8	33	48	15	24	1	16	13	9	2	2	1		25	15	21	4
3	6	1	25	95	78	80	144	161	66	94	13	65	64	31	17	3	1	2	69	53	98	7
	2		27	119	57	138	147	140	77	58	17	73	75	21	12					78	72	
26	65	2	184	1,228	512	1,252	1,195	1,329	1,451	403	226	653	812	214	120	26	8	7	386	394	764	59
	47		197	1,234	468	1,369	1,222	1,208	1,032	657	236	617	538	339	106					409	642	
	62		439	1,288	465	1,405	1,218	1,206	1,236	312	211	610	726	168	125					384	674	

VITAL STATISTICS

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns in

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
MARITIME DISTRICT.*													
City of New York:													
BOROUGH OF MANHATTAN	2,174,335	2,751	15.2	634	388	476	15	2	...	43	7	13	68
BOROUGH OF THE BRONX	290,097	468	19.4	65	62	78	1	...	...	28	7	1	11
BOROUGH OF BROOKLYN	1,404,569	1,790	15.3	418	220	392	13	2	3	29	21	5	45
BOROUGH OF QUEENS	209,685	241	13.8	64	27	52	2	2	...	3	1	1	2
BOROUGH OF RICHMOND	74,173	93	15.0	27	5	25	...	...	...	...	1	...	1
Totals	4,152,860	5,343	15.4	1,208	702	1,023	31	6	3	103	37	20	127
Oyster Bay	20,545	27	.....	7	2	9	...	...	...	...	...	1	...
Hempstead	34,746	33	.....	5	2	12	...	...	...	1	...	...	...
North Hempstead	14,163	7	.....	2	0	2	...	...	...	...	...	...	1
Southold	8,989	3	.....	1	0	1	...	...	...	...	...	...	...
Sag Harbor	3,048	4	.....	0	0	1	...	...	...	...	...	...	...
Huntington	10,236	12	.....	1	1	6	...	...	...	...	...	...	...
Brookhaven	16,050	12	.....	2	2	4	...	...	...	...	...	...	...
YONKERS	61,716	96	18.7	23	7	20	...	...	...	...	1	...	1
Greenburgh	18,635	17	.....	1	0	8	...	...	...	...	...	...	...
MOUNT VERNON	25,006	31	14.9	11	2	8	...	...	...	1	...	...	...
Port Chester	11,198	14	.....	1	1	3	1	...	...	...	...	...	...
Ossining	7,135	11	.....	4	1	4	...	...	...	...	...	1	1
NEW ROCHELLE	20,480	27	15.8	10	6	5	...	...	...	1	...	2	...
Peekskill	13,200	22	.....	4	2	5	...	1	...	...	...	1	...
White Plains	11,579	14	.....	1	1	6	...	...	...	...	...	...	...
Mamaroneck	5,090	10	.....	1	1	4	...	...	...	...	...	1	1
Rest of District	98,264	140	17.1	15	6	51	1	1	...	...	1	1	1
Totals for the District	4,523,940	5,823	15.4	1,297	736	1,172	33	8	3	106	39	27	132
Totals for June, 1905	4,273,767	6,000	16.5	1,422	712	554	38	5	...	96	35	41	123
HUDSON VALLEY DISTRICT.†													
ALBANY	100,000	138	16.6	10	22	39	1	...	...	...	1	1	11
COHOES	24,183	30	14.9	2	1	8	2	...	...	...	...	...	...
TROY	76,910	104	16.2	14	5	32	...	...	...	...	...	...	1
WATERVLIET	14,600	20	16.4	2	1	6	...	...	...	...	...	...	...
Green Island	4,878	6	.....	3	0	1	...	...	...	...	...	...	...
Hoosick Falls	5,251	6	.....	1	1	2	...	...	...	...	...	...	1
RENSSELAER	10,715	6	6.7	0	1	3	...	...	...	...	...	...	...
Coxsackie	4,317	4	.....	0	0	2	...	...	...	...	...	...	...
Catskill	5,294	6	.....	2	0	2	...	...	...	...	...	...	...
HUDSON	10,290	23	26.8	3	2	4	...	...	...	...	3	...	1
KINGSTON	25,556	33	15.5	2	2	10	...	1	...	...	...	...	...
Ellenville	2,872	4	.....	1	0	0	...	...	...	...	...	...	...
Marbletown	3,000	3	.....	0	0	2	...	...	...	...	...	...	...
Rosendale	4,670	7	.....	0	0	2	...	...	...	...	...	...	...
Esopus	4,786	3	.....	0	0	2	...	...	...	...	...	...	...
Saugerties	3,833	7	.....	1	0	4	...	...	...	...	...	...	...
POUGHKEEPSIE	25,379	34	16.1	4	3	14	...	...	...	1	...	...	...
Fishkill	13,183	12	.....	0	0	8	1	...	...	...	...	...	...
Wappingers Falls	3,588	1	.....	0	0	1	...	...	...	...	...	...	...
NEWBURG	26,500	25	11.3	2	1	7	...	...	...	...	...	...	...
Port Jervis	9,700	7	.....	1	0	3	...	...	...	...	...	...	...
MIDDLETOWN	14,516	19	15.7	3	2	5	...	...	...	...	...	1	...
Warwick	6,690	5	.....	0	1	2	...	...	...	...	...	...	...
Goshen	5,023	7	.....	0	0	2	...	...	...	1	...	...	...
Montgomery	6,652	11	.....	1	0	6	...	...	...	...	...	...	...

* Includes Greater New York, Long Island [Nassau and Suffolk counties] and Westchester county
† Includes Rockland, Putnam, Orange, Dutchess, Ulster, Greene, Columbia, Albany and Rensselaer counties.

FOR JUNE, 1906.

…type; Populations estimated to date printed in full faced figures.

Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
23	47	....	361	123	177	229	260	374	80	190	144	202	43	27	13	3	27	....	22	230	26
....	6	....	125	13	20	35	42	38	8	22	23	36	3	5	2	2	4	....	2	33	1
1	11	....	228	89	94	142	169	188	67	167	99	141	46	21	5	4	25	....	30	111	30
...	1	....	26	10	7	20	23	31	5	22	21	20	4	8	1	....	...	....	7	24	...
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24	66	....	758	240	303	439	501	634	163	404	292	403	98	61	21	10	56	....	64	413	60
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29	66	4	803	261	324	519	560	650	181	415	331	427	105	64	24	11	58	47	69	458	62
24	....	175	690	247	954	466	527	601	96	565	311	432	83	58	...	....	...	....	51	382	...
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VITAL STATISTICS FO

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC D Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.
HUDSON VALLEY DIST. (*Con.*)												
Haverstraw	10,482	6	....	2	1	1	...	...	...	...	...	...
Nyack	4,441	7	....	0	0	2	...	...	...	...	...	...
Ramapo	10,142	8	....	1	0	2	...	...	...	...	...	...
Rest of District	268,000	280	12.5	35	12	119	...	2	...	9	...	3
Totals for the District	705,500	822	14.0	90	55	291	4	3	...	11	4	5
Totals for June, 1905	696,000	828	14.5	119	42	155	13	1	...	6	8	4
ADIRONDACK AND NORTHERN DISTRICT.*												
WATERTOWN	25,447	31	14.6	5	1	14	...	...	...	...	...	...
Ellisburgh	3,740	3	....	0	1	0	...	...	...	...	...	...
Carthage	3,404	1	....	0	0	0	...	...	...	...	...	...
Clayton	4,100	4	....	1	0	1	...	...	...	...	...	...
OGDENSBURGH	13,179	19	17.3	6	1	7	...	...	...	...	...	...
Gouverneur	6,582	6	....	1	0	2	1	...	...	...	...	...
Potsdam	4,162	1	....	1	0	0	...	...	...	...	...	...
Canton	6,800	11	....	2	0	7	...	...	...	...	...	...
Malone	6,478	11	....	1	2	6	...	...	...	2	...	...
PLATTSBURGH	10,184	13	15.3	1	0	3	...	...	...	...	...	...
Glens Falls	14,650	21	....	1	0	9	...	...	...	...	...	...
Whitehall	4,148	2	....	0	0	1	...	...	...	...	...	...
Fort Edward	5,300	9	....	0	1	4	...	...	...	...	...	...
Sandy Hill	5,321	4	....	1	0	3	...	...	...	...	...	...
Granville	6,487	2	....	0	0	1	...	...	...	...	...	...
Greenwich	4,338	6	....	1	0	3	...	...	...	...	...	...
Lowville	3,921	4	....	0	0	4	...	...	...	...	...	...
Rest of District	279,800	278	11.9	41	12	120	2	...	...	...	1	8
Totals for the District	408,100	426	12.5	62	18	185	3	...	...	2	1	3
Totals for June, 1905	400,000	456	13.0	56	34	122	12	...	...	10	1	6
MOHAWK VALLEY DISTRICT.†												
SCHENECTADY	58,387	71	14.6	19	2	19	1	...	...	...	...	...
Cobleskill	3,731	8	....	1	1	4	...	...	...	...	...	...
AMSTERDAM	23,943	27	13.5	6	2	9	...	...	...	...	...	...
Fort Plain	2,600	1	....	0	0	0	...	...	...	...	...	...
JOHNSTOWN	9,845	3	3.7	0	0	1	...	...	...	...	...	...
GLOVERSVILLE	18,672	25	16.1	3	2	10	1	...	...	...	...	...
LITTLE FALLS	11,122	9	9.7	1	0	5	...	...	...	...	...	...
Herkimer	6,600	2	....	0	0	1	...	...	...	...	...	...
Ilion	5,924	9	....	2	0	6	...	...	...	...	...	...
UTICA	62,934	77	14.7	12	10	23	...	...	...	...	1	2
Whitestown	6,895	7	....	0	0	3	...	...	...	...	...	...
ROME	16,562	22	15.9	3	1	11	...	...	...	...	...	3
Boonville	3,167	3	....	1	0	0	...	...	...	...	...	...
Camden	3,750	6	....	1	0	4	...	...	...	...	...	...
Waterford	6,000	9	....	3	1	1	...	...	...	...	...	...
Mechanicville	5,877	5	....	1	0	1	...	...	...	...	...	...
Ballston Spa	4,131	7	....	1	0	1	...	...	...	...	...	...
Saratoga Springs	13,000	28	....	3	1	13	1	...	...	...	...	...
Rest of District	181,600	235	15.5	20	8	125	...	...	...	...	1	4
Totals for the District	444,740	554	15.0	77	28	237	3	...	...	...	2	9
Totals for June, 1905	435,600	490	14.0	58	24	143	4	1	...	7	1	1

* Includes Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jeffe
and Lewis counties.
† Includes Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida coun

JUNE, 1906 — (*Continued*).

...ASES.

Influenza	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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			6	61	30	63	64	69	18	14	9	39	28	8	4					38	23	

VITAL STATISTICS F(

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC I Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.
SOUTHERN TIER DISTRICT.*												
BINGHAMTON	42,036	48	13.7	9	2	13	...	1	...	...	...	...
Owego	5,010	6	.....	0	0	6	...	...	...	...	...	...
Candor	3,148	4	.....	1	0	2	...	...	...	...	...	...
Waverly	4,915	4	.....	1	0	3	...	...	...	...	...	...
ELMIRA	34,687	35	12.1	5	4	12	...	...	...	...	...	...
Horseheads	4,826	5	.....	0	0	2	...	...	...	...	...	...
HORNELL	13,259	8	7.2	1	0	1	...	...	...	...	...	...
Bath	3,700	9	.....	0	0	6	...	...	...	...	...	...
CORNING	13,515	15	13.3	3	1	8	...	...	...	...	...	...
Wellsville	4,355	3	.....	1	2	0	...	...	...	...	...	...
OLEAN	10,163	8	9.5	1	1	1	1	...	...	...	...	...
Salamanca	5,455	4	.....	1	0	1	...	...	...	...	...	...
DUNKIRK	15,250	19	15.0	5	1	7	...	...	...	...	...	1
JAMESTOWN	26,160	19	8.7	5	0	7	...	...	...	...	...	1
Westfield	2,823	2	.....	0	0	2	...	...	...	...	...	...
Fredonia	5,148	5	.....	1	1	2	1	...	...	...	...	...
Rest of District	244,500	251	12.3	32	6	139	1	1	...	1	...	2
Totals for the District	439,000	445	12.2	66	18	212	3	2	...	1	...	4
Totals for June, 1905	435,000	459	13.0	53	19	152	2	1	...	...	1	2
EAST CENTRAL DISTRICT.†												
SYRACUSE	117,500	157	16.0	25	15	43	...	...	...	...	5	2
Baldwinsville	2,961	0	.....	0	0	0	...	...	...	...	...	...
DeWitt	6,252	4	.....	0	0	2	...	...	...	...	...	...
CORTLAND	11,272	15	16.0	2	1	6	...	...	...	...	...	1
Homer	2,536	3	.....	0	0	2	...	...	...	...	...	...
ONEIDA	8,420	6	8.6	0	0	4	...	...	...	...	...	...
Hamilton	3,614	3	.....	0	0	3	...	...	...	...	...	...
Cazenovia	3,557	6	.....	0	0	5	...	...	...	...	...	...
Canastota	3,244	3	.....	1	0	1	...	...	...	...	...	...
Norwich	7,115	12	.....	0	0	8	...	...	...	...	...	...
Oneonta	8,054	6	.....	1	0	4	...	...	...	...	...	1
Worcester	2,328	1	.....	0	0	1	...	...	...	...	...	...
Cooperstown	2,446	5	.....	0	0	4	...	...	...	...	...	...
Walton	5,000	4	.....	1	0	1	...	...	...	...	...	...
Sidney	4,319	4	.....	2	0	0	...	...	...	...	...	...
Liberty	5,483	6	.....	1	0	1	...	...	...	...	...	1
Rest of District	220,100	220	12.0	21	7	114	2	...	...	...	2	3
Totals for the District	414,200	455	13.2	54	23	199	2	...	...	...	7	8
Totals for June, 1905	414,500	480	13.7	87	20	150	4	...	...	3	7	1
WEST CENTRAL DISTRICT.‡												
AUBURN	31,422	36	13.7	5	1	15	1	...	...	...	1	...
ITHACA	14,615	18	14.8	0	0	8	...	...	...	...	...	...
Hector	3,888	2	.....	0	0	2	...	...	...	...	...	...
Waterloo	4,123	7	.....	1	0	3	...	...	...	...	...	1
Seneca Falls	6,733	10	.....	0	0	7	...	...	...	...	...	...
GENEVA	12,249	12	11.8	2	0	4	...	...	...	1	...	...
Canandaigua	7,382	16	.....	4	1	8	1	...	...	1	...	...
Manchester	4,809	5	.....	0	0	5	...	...	...	...	...	...

* Includes Chautauqua, Cattaraugus, Allegany, Steuben, Chemung, Tioga and Broome count
† Includes Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland countie
‡ Includes Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and W
ming counties.

JUNE, 1906 — (*Continued*).

[Influenza].	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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3	2	...	1	25	24	18	54	68	18	13	1	39	27	11	2	4	1	2	46	36	32	2
...	4	...	3	32	20	70	57	65	24	9	6	42	25	10	4	...	...	...	...	44	34	...
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VITAL STATISTICS F

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.
WEST CENTRAL DIST.—(*Con.*).												
Phelps	4,757	4	....	0	1	1	...	...	...	...	...	...
Penn Yan	4,504	1	....	0	0	1	...	...	...	...	...	...
Batavia	10,080	13	....	2	0	6	...	...	...	...	...	...
Dansville	3,908	3	....	0	0	2	...	...	...	...	...	...
Le Roy	3,400	5	....	1	1	1	...	...	...	...	...	...
Warsaw	4,469	4	....	1	0	2	...	...	...	...	...	...
Rest of District	199,400	213	12.8	16	3	124	3	...	...	...	...	2
Totals for the District	315,700	349	13.3	32	7	189	5	...	...	2	1	3
Totals for June, 1905	320,600	343	13.5	29	10	132	...	...	...	6	2	2
LAKE ONTARIO AND WESTERN DISTRICT.*												
BUFFALO	376,587	402	12.8	77	20	74	5	...	...	2	4	6
TONAWANDA	7,904	6	9.1	1	0	1	1	...	...	...	...	...
Amherst	4,500	5	....	0	0	1	1	...	...	...	...	...
NORTH TONAWANDA	10,197	19	22.3	7	0	5	...	...	...	...	...	...
LOCKPORT	17,552	22	15.0	1	2	8	2	...	...	...	...	...
NIAGARA FALLS	26,560	33	14.9	9	3	6	1	...	...	...	...	...
Medina	5,114	5	....	1	0	2	...	...	...	...	...	...
Albion	5,174	7	....	0	0	4	...	...	...	...	...	...
Brockport	3,627	7	....	0	1	3	...	...	...	...	...	...
ROCHESTER	181,666	209	13.8	19	12	68	4	...	...	...	2	...
Palmyra	4,042	4	....	0	0	3	...	...	...	...	...	...
Newark	4,554	6	....	2	0	3	...	...	...	...	...	...
Lyons	4,758	2	....	0	2	0	...	...	...	...	2	...
Clyde	2,552	4	....	0	0	2	...	...	...	...	...	...
OSWEGO	22,572	25	13.3	1	0	12	1	...	...	...	...	...
FULTON	8,847	20	27.1	2	1	12	...	...	...	...	...	...
Richland	3,611	5	....	0	0	4	...	...	...	...	...	...
Rest of District	257,500	282	13.1	38	14	146	3	...	...	4	3	4
Totals for the District	947,500	1,063	13.5	158	55	354	18	...	...	6	11	10
Totals for June, 1905	945,200	944	12.5	146	60	205	9	1	...	15	3	12
Totals for the State	8,198,500	9,937	14.5	1,836	940	2,839	71	13	3	128	65	69
Average past five years	....	9,846	15.7	1,845	1,958	1,545	83	15	29	114	105	62
Totals for June, 1905	7,918,000	10,000	15.5	1,920	921	1,613	82	9	...	143	58	69

*Includes Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

JUNE, 1906 — (*Concluded*).

...ASES.																						
Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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2	...	...	1	25	31	14	62	58	20	7	1	25	8	13	3	2	...	4	13	26	23	...
...	2	...	...	30	27	42	43	47	8	10	4	28	23	8	2	...	...	...	...	31	25	...
...	2	6	...	34	28	...	65	46	31	20	13	35	11	16	2	...	...	...	16	24	33	...
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1	...	...	3	14	10	9	43	63	12	11	2	18	14	9	1	1	...	2	17	7	28	2
2	2	6	7	80	70	24	154	158	64	44	16	88	49	34	4	3	...	3	54	49	92	5
...	6	...	11	90	57	132	120	118	41	35	27	63	33	8	15	...	...	...	...	59	70	...
22	40	72	28	1,141	500	492	1,098	1,143	868	343	441	686	635	218	95	41	15	71	319	277	781	89
...	30	...	113	1,062	435	1,677	989	999	637	701	566	584	551	226	90	...	...	...	...	340	863	...
...	42	...	210	1,105	488	1,487	999	1,022	769	202	643	616	660	141	95	...	...	...	...	336	658	...

VITAL STATISTICS

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns in

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES.			EPIDEMIC DIS						
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
MARITIME DISTRICT.*													
City of New York:													
BOROUGH OF MANHATTAN	2,174,335	3,322	18.3	1,029	390	502	24	6	...	27	8	15	55
BOROUGH OF THE BRONX	290,097	534	22.1	143	61	75	3	...	...	17	3	3	...
BOROUGH OF BROOKLYN	1,404,569	2,352	20.1	812	282	280	23	5	...	20	14	16	48
BOROUGH OF QUEENS	209,685	389	22.3	145	39	58	3	...	...	2	...	4	5
BOROUGH OF RICHMOND	74,173	197	31.8	90	18	28	1	...	...	1	...	3	2
Totals	4,152,860	6,794	19.6	2,219	790	943	54	11	...	67	25	41	110
Oyster Bay	20,545	22	.....	9	2	7	...	...	...	...	1	1	1
Hempstead	34,746	36	.....	7	5	11	...	...	...	...	...	1	1
North Hempstead	14,163	32	.....	11	2	6	1	...	...	...	...	1	1
Southold	8,989	11	.....	3	0	5	...	...	...	...	...	...	...
Sag Harbor	3,048	7	.....	0	1	2	...	...	...	...	...	...	...
Huntington	10,236	16	.....	3	2	9	...	...	...	...	...	...	...
Brookhaven	16,050	21	.....	3	0	13	...	...	...	...	...	...	...
YONKERS	61,716	96	18.7	34	12	12	...	...	...	1	1	2	1
Greenburgh	18,635	28	.....	10	3	4	1	...	...	...	...	...	...
MOUNT VERNON	25,006	44	21.1	17	8	7	...	...	...	...	...	1	...
Port Chester	11,198	29	.....	17	3	4	...	...	...	...	...	1	...
Ossining	7,135	15	.....	5	1	5	...	...	...	...	...	1	...
NEW ROCHELLE	20,480	42	24.6	17	6	9	...	...	...	3	1	1	...
Peekskill	13,200	19	.....	2	2	9	1	...	...	...	...	...	...
White Plains	11,579	21	.....	12	2	3	...	...	...	...	...	...	...
Mamaroneck	5,090	9	.....	3	1	1	...	...	...	...	...	...	...
Rest of District	98,264	191	23.3	43	9	55	...	1	...	...	...	2	1
Totals for the District	4,523,940	7,433	19.7	2,415	849	1,105	57	12	...	71	28	52	115
Totals for July, 1905	4,273,767	8,201	22.6	3,016	928	686	82	12	...	74	14	61	99
HUDSON VALLEY DISTRICT.†													
ALBANY	100,000	149	17.9	23	12	42	3	...	...	...	...	2	2
COHOES	24,183	35	17.4	12	1	10	...	...	...	...	...	...	2
TROY	76,910	129	20.1	34	9	32	2	...	...	1	1	...	...
WATERVLIET	14,600	17	14.0	5	2	5	1	...	...	...	...	...	...
Green Island	4,878	9	.....	2	0	3	1	...	...	...	...	...	...
Hoosick Falls	5,251	5	.....	2	0	3	...	...	...	...	...	...	...
RENSSELAER	10,715	13	14.6	4	1	3	...	...	...	...	...	1	...
Coxsackie	4,317	11	.....	3	1	6	...	...	...	...	...	...	...
Catskill	5,294	9	.....	1	0	3	...	...	...	...	...	...	...
HUDSON	10,290	20	23.3	5	3	3	...	...	...	...	...	...	2
KINGSTON	25,556	39	18.3	7	5	11	1	...	...	...	...	...	1
Ellenville	2,872	8	.....	0	0	4	...	...	...	...	...	...	...
Marbletown	3,000	4	.....	1	1	0	...	...	...	...	...	...	...
Rosendale	4,670	6	.....	1	1	1	...	...	...	...	...	...	...
Esopus	4,786	9	.....	0	0	2	...	...	...	...	...	...	...
Saugerties	3,833	7	.....	0	0	5	...	...	...	...	...	...	...
POUGHKEEPSIE	25,379	30	14.2	5	3	13	1	...	...	...	...	...	...
Fishkill	13,183	11	.....	2	0	6	...	...	...	...	...	...	...
Wappingers Falls	3,588	2	.....	0	0	0	1	...	...	...	...	...	...
NEWBURG	26,500	50	22.6	5	5	14	2	1	...	...	...	...	...
Port Jervis	9,700	21	.....	4	1	10	1	...	...	...	...	...	...
MIDDLETOWN	14,516	12	9.9	1	1	7	...	1	...	...	...	1	...
Warwick	6,690	4	.....	2	1	1	...	...	...	...	...	3	...
Goshen	5,023	8	.....	2	1	4	...	...	...	...	...	1	...
Montgomery	6,652	8	.....	2	0	2	1	...	...	...	...	...	...

* Includes Greater New York, Long Island [Nassau and Suffolk counties] and Westchester county.
† Includes Rockland, Putnam, Orange, Dutchess, Ulster, Greene, Columbia, Albany and Rensselaer counties.

FOR JULY, 1906.

Roman type; Populations estimated to date printed in full faced figures.

ASES.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
2	12	36	....	352	188	193	167	330	240	63	642	200	187	49	33	8	6	21	194	23	252	30
....	1	2	....	109	23	27	28	28	35	4	86	31	42	4	3	1	2	...	30	2	34	16
1	2	12	....	220	83	121	149	163	138	43	572	152	151	38	20	7	4	18	100	25	147	60
....	1	3	....	22	10	19	22	30	20	3	109	23	28	9	5	3	....	...	22	2	35	9
....	....	1	....	22	6	6	11	17	10	3	64	7	4	1	....	....	....	1	10	1	16	10
3	16	54	....	725	260	366	377	568	443	116	1473	413	412	101	61	19	12	40	356	53	484	134
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3	17	54	3	766	285	400	450	639	458	135	1526	515	437	113	70	24	12	42	400	66	544	139
....	8	....	106	698	292	1,179	542	500	455	84	2215	433	434	67	78	...		...	....	88	672	...
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VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
HUDSON VALLEY DIST.—(*Con.*)													
Haverstraw	10,482	4	....	2	0	1	...	...	...	...	...	...	...
Nyack	4,441	.....	....	0	0	0	...	...	...	...	...	...	...
Ramapo	10,142	7	....	3	0	0	...	...	...	...	...	...	...
Rest of District	268,000	329	14.7	50	17	136	2	1	...	1	...	3	3
Totals for the District	705,500	956	16.3	178	65	327	16	3	...	2	1	11	10
Totals for July, 1905	696,000	1,074	18.0	246	74	205	13	2	...	1	...	8	10
ADIRONDACK AND NORTHERN DISTRICT.*													
WATERTOWN	25,447	45	21.2	4	2	15	...	...	...	...	...	...	3
Ellisburgh	3,740	3	....	1	0	2	...	...	...	...	...	...	...
Carthage	3,404	1	....	0	0	1	...	...	...	...	...	...	...
Clayton	4,100	5	....	0	0	5	...	...	...	...	...	...	...
OGDENSBURGH	13,179	22	20.0	6	0	6	...	...	...	...	...	...	...
Gouverneur	6,582	10	....	2	1	3	...	...	...	...	...	...	...
Potsdam	4,162	4	....	0	0	0	...	...	...	...	...	...	...
Canton	6,800	10	....	0	0	8	...	...	...	...	...	...	...
Malone	6,478	5	....	1	1	1	...	...	...	...	...	...	...
PLATTSBURGH	10,184	6	7.1	1	1	3	...	...	...	...	...	...	...
Glens Falls	14,650	23	....	3	3	8	...	...	...	...	...	...	...
Whitehall	4,148	7	....	1	0	1	...	...	...	...	...	...	...
Fort Edward	5,300	8	....	1	1	3	...	...	...	...	...	...	...
Sandy Hill	5,321	3	....	1	0	1	...	...	...	...	...	...	...
Granville	6,487	6	....	2	0	0	...	...	...	...	...	1	...
Greenwich	4,338	5	....	0	0	4	...	...	...	...	...	...	...
Lowville	3,921	3	....	0	0	1	...	...	...	...	...	...	...
Rest of District	279,875	321	13.7	42	13	133	5	...	...	2	1	6	6
Totals for the District	408,116	487	14.3	65	22	195	5	...	...	2	1	7	9
Totals for July, 1905	400,000	465	13.5	75	30	131	4	1	...	4	1	7	5
MOHAWK VALLEY DISTRICT.†													
SCHENECTADY	58,387	88	18.1	41	7	13	...	...	...	...	...	3	...
Cobleskill	3,731	2	....	1	0	0	...	...	...	...	...	...	...
AMSTERDAM	23,943	41	20.5	16	1	9	...	...	...	...	...	...	...
Fort Plain	2,600	1	....	0	0	0	...	...	...	...	...	...	...
JOHNSTOWN	9,845	6	7.3	0	0	2	...	...	...	...	...	...	...
GLOVERSVILLE	18,672	16	10.3	2	2	5	...	...	...	...	...	...	...
LITTLE FALLS	11,122	12	12.9	2	2	1	...	...	...	...	...	1	...
Herkimer	6,600	13	....	2	0	2	1	...	...	...	...	...	1
Ilion	5,924	11	....	1	1	4	...	...	...	...	...	...	...
UTICA	62,934	121	23.1	45	11	24	...	1	...	2	...	2	1
Whitestown	6,895	4	....	1	0	0	...	...	...	...	...	...	...
ROME	16,562	20	14.5	1	1	10	...	...	...	...	...	...	...
Boonville	3,167	3	....	1	0	1	...	...	...	...	...	...	...
Camden	3,750	5	....	0	0	2	...	...	...	...	...	...	...
Waterford	6,000	5	....	2	1	0	...	...	...	...	...	...	...
Mechanicville	5,877	10	....	4	1	0	...	...	...	...	...	...	...
Ballston Spa	4,131	0	....	0	0	0	...	...	...	...	...	...	...
Saratoga Springs	13,000	27	....	5	3	5	...	...	...	...	...	...	...
Rest of District	181,600	204	13.5	33	5	101	1	...	...	...	2	2	1
Totals for the District	444,740	589	15.9	157	35	179	2	1	...	2	2	8	3
Totals for July, 1905	435,600	543	14.5	121	29	142	4	...	...	4	2	3	2

* Includes Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis counties.
† Includes Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties.

JULY, 1906 — (Continued).

EASES.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
				1				1			2											
						1						1	2		1				2			
	1		1	25	24	18	48	45	10	5	22	23	18	4	1	1		2	19	20	31	1
	2		3	77	54	56	114	111	26	24	76	85	67	16	5	3		3	51	38	88	14
			9	98	42	109	142	117	18	17	166	89	76	24	6					37	90	
				1	5	6	6	6		1		4	2	2		1			3	1	4	
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				2	2	2	3		1	1	1	2	1	1					2	2	2	1
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1	1		2	34	19	16	42	34	14	6	3	23	16	9	5	1		1	23	15	34	2
2	1		3	49	29	34	58	57	15	10	9	34	24	16	5	4	1	2	36	22	49	3
			1	43	23	64	62	51	16	9	25	50	29	3	7					29	31	
			1	6		3	5	2	4	5	5	29	2	1	2			1	6	1	11	1
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				4			2	5	2	2	12	4	3			1			2		4	
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				2			1					2									1	
				2	1	1	4				1	2	2	1							1	1
				2		1	1	1	1				1							1	2	1
				1		1	1	2				4						1				1
				3			1	3		1		2	1									
			1	9	3	10	11	10	3	3	19	9	3	4	1		1	1	16	2	9	
					1							2									1	
				2		1	3	3	2	1	1	1								4	2	
								1				1							1			
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				1							1	1	1									1
					1	1			1		2	2							2		1	
				4	2		1	2	3	1	2		6		1	1		1	2		1	
				16	7	5	33	21	9	4	5	14	12	8	3	3			19	12	25	2
			2	55	15	23	64	52	25	18	48	74	32	14	7	5	1	4	48	21	58	7
	1		6	40	25	74	63	52	16	7	53	50	29	12	5					36	58	

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
SOUTHERN TIER DISTRICT.*													
BINGHAMTON	42,036	61	17.4	13	2	17	...	...	...	1	...	2	...
Owego	5,010	3	.....	0	1	1	...	...	...	...	...	...	...
Candor	3,148	2	.....	0	0	2	...	...	...	...	...	...	...
Waverly	4,915	5	.....	0	0	4	...	...	...	...	...	...	...
ELMIRA	34,687	40	13.8	10	2	12	...	...	...	...	...	1	...
Horseheads	4,826	6	.....	1	0	2	...	...	...	...	...	...	...
HORNELL	13,259	8	7.2	1	0	3	...	...	...	...	...	...	...
Bath	3,700	8	.....	0	0	6	...	...	...	...	...	...	...
CORNING	13,515	8	7.1	2	0	2	...	...	...	...	...	...	...
Wellsville	4,355	5	.....	1	0	3	...	...	...	...	...	...	...
OLEAN	10,163	11	13.0	0	1	6	...	...	...	...	...	...	...
Salamanca	5,455	8	.....	1	0	3	...	...	...	...	...	...	...
DUNKIRK	15,250	18	14.2	4	0	3	...	...	...	...	...	...	...
JAMESTOWN	26,160	19	8.7	1	0	9	1	...	...	...	...	...	...
Westfield	2,823	6	.....	3	0	0	...	...	...	...	...	...	...
Fredonia	5,148	6	.....	2	0	1	...	...	...	...	...	...	...
Rest of District	244,500	251	12.3	17	5	152	6	...	...	...	...	3	...
Totals for the District	439,000	465	12.7	56	11	226	7	...	...	1	...	6	...
Totals for July, 1905	435,000	483	13.0	74	20	115	5	...	...	1	3	1	8
EAST CENTRAL DISTRICT.†													
SYRACUSE	117,500	170	17.4	62	9	41	1	...	...	...	...	1	1
Baldwinsville	2,961	2	.....	0	0	2	...	...	...	...	...	...	...
DeWitt	6,252	10	.....	3	0	4	...	...	...	...	...	...	...
CORTLAND	11,272	8	8.5	3	1	3	...	...	...	...	...	2	...
Homer	2,536	3	.....	0	0	3	...	...	...	...	...	...	...
ONEIDA	8,420	11	15.6	4	0	2	...	...	...	...	...	...	...
Hamilton	3,614	1	.....	0	0	1	...	...	...	...	...	...	...
Cazenovia	3,557	3	.....	0	0	3	...	...	...	...	...	...	...
Canastota	3,244	3	.....	0	0	1	...	...	...	...	...	...	...
Norwich	7,115	10	.....	1	1	7	...	...	...	...	...	...	...
Oneonta	8,054	9	.....	1	1	4	...	...	...	...	...	1	...
Worcester	2,328	.....	.....	.....	.....	.....	...	...	...	...	...	...	...
Cooperstown	2,446	5	.....	0	0	4	...	...	...	...	...	...	...
Walton	5,000	2	.....	0	0	2	...	...	...	...	...	...	...
Sidney	4,319	2	.....	0	0	2	...	...	...	...	...	...	...
Liberty	5,483	23	.....	0	0	7	...	...	...	...	...	...	...
Rest of District	220,100	229	12.5	19	6	127	...	...	...	...	1	...	...
Totals for the District	414,200	491	14.1	93	18	213	1	...	...	...	1	4	1
Totals for July, 1905	414,500	525	15.0	80	25	148	4	1	...	...	5	3	3
WEST CENTRAL DISTRICT.‡													
AUBURN	31,422	34	13.0	11	1	13	...	...	...	...	...	...	...
ITHACA	14,615	12	9.9	2	1	3	...	...	...	...	...	...	...
Hector	3,888	11	.....	1	0	5	...	...	...	...	...	...	...
Waterloo	4,123	5	.....	0	0	4	...	...	...	...	...	...	...
Seneca Falls	6,733	10	.....	0	1	4	...	...	...	...	...	...	...
GENEVA	12,249	20	19.6	3	1	6	...	...	...	2	...	...	...
Canandaigua	7,332	6	.....	3	0	2	...	...	...	1	...	...	...
Manchester	4,809	6	.....	0	0	3	...	...	...	...	...	...	1

* Includes Chautauqua, Cattaraugus, Allegany, Steuben, Chemung, Tioga and Broome counties
† Includes Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties.
‡ Includes Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties.

JULY, 1906 — (*Continued*).

EASES.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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....	....	....	1	31	23	25	53	74	7	11	17	53	36	16	....	3	....	2	30	81	83	5
....	2	....	2	40	27	65	69	62	9	5	26	43	25	9	8	....	....	....	....	84	30	....
....	....	....	....	13	10	2	15	23	8	4	29	14	7	2	1	2	....	1	20	4	10	7
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....	....	....	3	36	29	15	60	82	10	14	34	44	28	13	4	2	....	3	36	21	40	10
....	2	....	2	54	29	68	78	79	18	5	40	36	21	12	3	....	....	....	....	31	31	....
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VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS- Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
WEST CENTRAL DIST.—(*Con.*).													
Phelps	4,757	3	.....	1	0	1	...	...	...	...	...	...	...
Penn Yan	4,504	5	.....	0	0	4	...	...	...	...	...	...	...
Batavia	10,080	10	.....	1	0	5	...	1	...	...	...	...	...
Dansville	3,908	1	.....	0	0	0	...	...	...	...	...	...	...
Le Roy	3,400	3	.....	0	0	2	...	...	...	...	...	...	...
Warsaw	4,469	8	.....	2	0	5	...	...	...	...	...	...	...
Rest of District	199,400	200	12.1	25	5	104	2	...	...	...	...	...	...
Totals for the District	315,700	334	12.7	49	9	161	2	1	...	3	...	...	1
Totals for July, 1905	320,600	371	14.0	38	13	118	...	2	...	2	...	1	8
LAKE ONTARIO AND WESTERN DISTRICT.*													
BUFFALO	376,587	515	16.4	130	38	101	8	...	...	3	...	1	3
TONAWANDA	7,904	4	6.1	0	0	3	...	...	...	...	...	...	...
Amherst	4,500	5	.....	1	0	3	...	...	...	...	...	...	...
NORTH TONAWANDA	10,197	9	10.6	3	0	3	...	...	...	...	...	...	...
LOCKPORT	17,552	9	6.2	0	0	5	...	...	...	...	...	...	...
NIAGARA FALLS	26,560	27	12.2	8	5	5	...	...	...	...	...	1	1
Medina	5,114	9	.....	0	0	4	...	...	...	...	...	...	...
Albion	5,174	6	.....	2	0	2	...	...	...	...	...	...	...
Brockport	3,627	4	.....	0	0	3	...	...	...	...	...	...	...
ROCHESTER	181,666	234	15.5	58	9	55	8	...	...	...	...	...	4
Palmyra	4,042	5	.....	0	0	1	...	...	...	...	...	...	...
Newark	4,554	2	.....	0	0	1	...	...	...	...	...	...	...
Lyons	4,758	4	.....	0	0	1	...	...	...	...	...	...	...
Clyde	2,552	1	.....	0	0	0	...	...	...	...	...	...	...
OSWEGO	22,572	19	10.1	2	1	5	...	...	...	...	...	...	1
FULTON	8,847	13	17.6	1	1	2	...	...	...	...	...	...	...
Richland	3,611	2	.....	0	0	1	...	...	...	...	...	...	...
Rest of District	257,500	308	14.4	48	12	134	1	...	...	2	1	3	2
Totals for the District	947,500	1,176	15.0	253	66	329	7	...	...	5	1	5	11
Totals for July, 1905	945,200	1,148	14.5	154	161	228	14	...	...	2	7	20	16
Totals for the State	8,198,500	11,931	17.5	3,266	1,075	2,735	97	17	...	86	34	93	150
Average past five years	....	11,840	18.3	3,669	3,292	1,656	116	16	24	76	70	79	178
Totals for July, 1905	7,918,000	12,810	19.2	3,804	1,280	1,773	126	18	...	88	32	104	147

* Includes Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

JULY, 1906 — (*Concluded*).

EASES.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
									1	1			1									
						2	1	1					1									
				3		1	1	1						1					1		1	
													1									
						1	1					1										
							1	1				2						1		3		
1	1		3	7	11	11	29	38	6	2	9	20	6	3		2	1	1	9	17	19	2
1	1		4	15	18	25	43	50	14	8	15	38	15	5	3	2	1	2	14	23	28	2
	1		1	23	25	35	58	47	18		19	37	19	8	3					33	36	
	1	6		40	30	76	59	60	13	27	40	34	18	9	14	1	1		10	16	50	
				1	1			1						1								
								2		1									1		1	
							1	2		1	2	1	1								1	
				1			2	1	1			1								1	2	
				1	1	2	5	2		1		3	1						4		5	
				1	2	2	1					1	1								1	
					2	1		1			1								1			
							1	1		1		1										
	1		3	17	11	10	28	23	1	10	31	17	16	2	3				14	12	21	7
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				1	2		4	2		2		2	2						1		1	1
					1	2	1	2										1			6	
					1			1														
			1	17	17	24	35	52	3	5	22	22	15	6	4	4		4	13	14	39	2
	2	6	4	80	70	118	139	152	18	48	96	84	54	18	21	5	1	5	44	43	129	10
			7	94	63	166	110	128	26	12	120	86	59	37	14					62	105	
6	23	60	23	1,107	523	696	981	1,218	573	268	1821	927	693	211	115	48	16	63	659	265	969	190
	17		81	1,067	463	1,843	1,095	969	439	543	2245	675	571	234	105					374	742	
	14		133	1,090	526	1,760	1,124	1.045	576	139	2664	824	693	171	124					350	1062	

VITAL STATISTICS

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns in

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DI[SEASES] Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
MARITIME DISTRICT.*													
City of New York:													
BOROUGH OF MANHATTAN	2,174,335	3,399	18.8	1,146	311	411	82	5	...	10	4	24	16
BOROUGH OF THE BRONX	290,097	557	23.0	147	51	95	7	...	...	3	1	9	4
BOROUGH OF BROOKLYN	1,404,569	2,096	17.9	699	230	279	31	...	...	11	6	19	33
BOROUGH OF QUEENS	209,685	379	21.6	154	34	54	4	1	...	1	...	3	7
BOROUGH OF RICHMOND	74,173	184	29.8	77	14	87	3	1	...	...	1	2	5
Totals	4,152,860	6,615	19.1	2,223	640	876	77	7	...	25	12	57	65
Oyster Bay	20,545	25	.....	7	3	6	...	1	...	...	...	...	...
Hempstead	34,746	51	.....	6	4	23	1	...	...	...	1	...	1
North Hempstead	14,163	26	.....	8	1	7	...	...	...	...	...	...	1
Southold	8,989	3	.....	1	0	1	...	...	...	...	...	...	...
Sag Harbor	3,048	4	.....	1	0	1	...	...	...	...	...	...	...
Huntington	10,236	9	.....	4	0	1	...	...	...	...	...	...	...
Brookhaven	16,050	15	.....	3	0	9	...	...	...	...	...	...	...
YONKERS	61,716	101	19.6	28	8	20	1	...	...	...	...	2	...
Greenburgh	18,635	27	.....	10	1	5	1	...	...	...	...	...	...
MOUNT VERNON	25,006	30	14.4	7	11	4	1	...	...	1	...	...	...
Port Chester	11,198	17	.....	4	2	3	...	...	...	...	...	1	1
Ossining	7,135	12	.....	3	2	1	...	...	...	...	...	2	...
NEW ROCHELLE	20,480	33	19.3	7	3	7	1	...	...	...	...	1	...
Peekskill	13,200	17	.....	8	2	3	...	...	...	...	...	...	...
White Plains	11,579	25	.....	8	1	5	...	...	...	...	...	...	...
Mamaroneck	5,090	9	.....	2	3	2	...	...	...	...	...	...	...
Rest of District	98,264	193	23.6	24	10	62	3	...	...	1	...	2	...
Totals for the District	4,523,940	7,212	19.1	2,354	691	1,036	85	8	...	27	13	65	68
Totals for August, 1905	4,273,767	6,727	18.3	2,136	798	601	112	7	1	38	7	65	90
HUDSON VALLEY DISTRICT.†													
ALBANY	100,000	170	20.4	27	36	60	3	...	...	...	...	2	1
COHOES	24,183	33	16.4	17	5	5	...	...	...	...	...	...	...
TROY	76,910	184	20.9	34	3	31	...	...	...	...	...	1	...
WATERVLIET	14,600	23	18.9	7	3	6	1	...	...	...	...	...	...
Green Island	4,878	6	.....	0	0	2	...	...	...	...	...	...	...
Hoosick Falls	5,251	5	.....	1	0	1	...	...	...	...	...	...	...
RENSSELAER	10,715	20	22.4	5	1	9	...	...	...	...	...	...	...
Coxsackie	4,317	9	.....	1	0	6	...	...	...	...	...	...	...
Catskill	5,294	15	.....	5	0	6	...	...	...	...	...	...	...
HUDSON	10,290	15	17.5	2	2	6	...	...	...	...	...	...	...
KINGSTON	25,556	55	25.8	9	17	12	...	...	...	...	...	...	...
Ellenville	2,872	1	.....	0	0	1	...	...	...	...	...	...	...
Marbletown	3,000	7	.....	1	1	3	...	...	...	...	...	...	...
Rosendale	4,670	9	.....	3	0	3	1	...	...	...	...	...	...
Esopus	4,786	13	.....	2	0	6	...	...	...	...	...	...	...
Saugerties	3,833	3	.....	1	0	2	...	...	...	...	...	...	...
POUGHKEEPSIE	25,379	34	16.1	11	2	14	1	...	...	...	...	...	2
Fishkill	13,183	40	.....	11	1	15	...	...	...	...	...	...	1
Wappingers Falls	3,588	1	.....	1	0	0	...	...	...	...	...	...	...
NEWBURG	26,500	55	24.9	14	2	17	2	...	...	...	...	...	...
Port Jervis	9,700	16	.....	4	0	3	...	...	...	...	...	...	1
MIDDLETOWN	14,516	25	20.7	5	5	11	1	...	...	...	...	...	...
Warwick	6,690	6	.....	0	1	3	...	...	...	...	...	...	...
Goshen	5,023	14	.....	2	0	4	1	...	...	...	...	...	...
Montgomery	6,652	8	.....	2	0	0	...	...	...	...	...	...	...

* Includes Greater New York, Long Island [Nassau and Suffolk counties] and Westchester county.

† Includes Rockland, Putnam, Orange, Dutchess, Ulster, Greene, Columbia, Albany and Rensselaer counties.

FOR AUGUST, 1906.

Roman type; Populations estimated to date printed in full faced figures.

EASES.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
....	5	17	....	373	145	188	176	235	252	64	708	211	220	60	39	12	5	15	219	32	263	79
....	1	4	....	104	21	27	40	34	26	8	91	29	45	9	2	3	1	7	22	5	47	7
....	5	10	....	194	79	105	139	187	111	51	438	158	126	31	21	6	4	16	119	37	136	78
....	....	1	....	24	14	14	23	20	19	6	99	27	24	5	3	2	....	....	17	5	39	21
....	....	....	....	13	5	7	7	18	5	5	54	10	13	2	1	....	....	1	8	6	10	12
....	11	32	....	708	264	341	385	439	413	134	1390	435	428	107	56	23	10	39	385	85	495	192
....	....	....	....	3	1	3	1	2	....	....	5	3	1	1	1	....	....	1	....	....	1	1
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....	....	....	....	....	2	2	....	2	1	2	6	....	1	1	1	....	....	....	2	1	4	....
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....	....	....	....	7	2	6	9	8	3	2	19	11	7	2	1	....	....	....	8	2	11	....
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....	....	....	....	4	....	....	4	3	....	1	3	2	1	3	....	....	....	....	3	1	5	1
....	1	....	....	1	1	1	1	2	....	1	6	1	1	....	....	....	....	....	....	....	....	1
....	....	....	....	1	2	....	....	5	2	1	2	1	1	1	2	....	....	....	3	1	1	2
....	....	....	....	....	....	3	1	....	....	....	3	1	....	....	....	....	....	....	....	....	....	1
....	....	....	....	19	13	13	29	27	1	1	15	23	11	5	1	1	1	....	6	5	13	3
....	13	32	3	751	295	377	447	499	422	145	1472	490	461	128	64	28	11	40	418	101	546	203
....	10	....	72	688	267	987	435	506	448	83	1468	416	417	73	61	....	....	....	....	77	399	....
....	....	3	....	20	10	10	16	18	4	3	16	24	15	5	3	....	1	....	....	6	....	10
....	....	....	....	3	....	2	....	5	....	....	13	....	....	1	....	....	....	1	7	....	1	....
....	1	....	....	20	3	10	8	20	3	6	13	12	7	....	3	....	....	....	8	3	5	11
....	....	....	....	....	....	1	3	1	....	1	6	....	2	....	....	....	....	....	2	2	3	1
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....	....	....	....	3	1	3	5	3	2	1	18	8	2	....	....	....	....	....	1	3	8	2
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....	....	....	....	4	1	....	2	1	....	4	7	4	3	1	1	....	....	1	8	1	5	1
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....	....	....	1	6	3	5	5	5	1	2	9	2	1	2	1	1	....	....	3	2	2	2
....	....	....	....	1	....	1	....	1	1	....	3	3	1	....	....	....	....	....	....	....	4	....
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....	....	....	....	2	1	....	....	1	....	....	2	2	2	....	....	....	....	....	1	2	....	....
....	....	....	....	1	....	....	....	....	....	....	1	1	1	1	1	....	....	....	1	....	1	....

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
HUDSON VALLEY DIST.—(*Con.*)													
Haverstraw	10,482	8	.....	0	1	4	1	...	...	...	...	...	...
Nyack	4,441	10	.....	4	0	2	...	...	...	...	...	...	...
Ramapo	10,142	21	.....	2	1	9	...	...	...	...	...	...	1
Rest of District	268,000	341	15.3	52	18	146	5	...	...	...	2	2	4
Totals for the District	705,500	1,097	18.6	223	99	387	16	...	...	...	2	5	10
Totals for August, 1905	696,000	1,073	18.0	232	63	204	20	4	...	2	2	15	9
ADIRONDACK AND NORTHERN DISTRICT.*													
WATERTOWN	25,447	42	19.8	14	6	6	...	...	...	...	...	...	2
Ellisburgh	3,740	7	.....	0	0	3	...	...	...	...	...	...	...
Carthage	3,404	4	.....	3	0	0	...	...	...	...	...	...	...
Clayton	4,100	9	.....	2	0	3	...	...	...	...	...	...	...
OGDENSBURGH	13,179	34	31.0	17	2	8	2	...	...	...	...	...	...
Gouverneur	6,582	12	.....	4	0	4	...	...	...	...	...	...	...
Potsdam	4,162	0	.....	0	0	0	...	...	...	...	...	...	...
Canton	6,800	6	.....	1	2	2	...	...	...	...	...	...	...
Malone	6,478	7	.....	2	0	6	...	...	...	...	...	...	...
PLATTSBURGH	10,184	22	25.9	15	2	3	...	...	...	...	...	...	1
Glens Falls	14,650	20	.....	8	0	6	1	...	...	...	...	...	...
Whitehall	4,148	8	.....	2	1	3	...	...	...	...	...	...	...
Fort Edward	5,300	13	.....	3	1	4	1	...	...	...	...	...	...
Sandy Hill	5,321	6	.....	3	0	1	...	...	...	...	...	...	...
Granville	6,487	10	.....	1	2	4	1	...	...	...	...	...	...
Greenwich	4,338	4	.....	0	0	3	...	...	...	...	...	...	...
Lowville	3,921	6	.....	1	1	3	...	...	...	...	...	...	...
Rest of District	279,875	346	14.8	40	26	158	5	...	...	...	...	1	5
Totals for the District	408,100	556	16.3	116	43	217	10	...	...	...	...	1	8
Totals for August, 1905	400,000	576	16.5	105	45	152	5	...	...	2	...	12	...
MOHAWK VALLEY DISTRICT.†													
SCHENECTADY	58,387	85	17.5	39	9	12	2	...	...	...	1	...	...
Cobleskill	3,731	4	.....	2	0	2	...	...	...	...	...	...	...
AMSTERDAM	23,943	47	23.6	19	4	16	...	...	...	...	...	...	1
Fort Plain	2,600	5	.....	1	0	2	...	...	...	...	...	...	...
JOHNSTOWN	9,845	13	15.8	2	0	6	...	...	...	...	...	...	...
GLOVERSVILLE	18,672	27	17.4	8	2	8	...	...	...	...	...	...	...
LITTLE FALLS	11,122	10	10.8	3	1	3	...	...	...	...	...	...	...
Herkimer	6,600	15	.....	3	0	5	...	...	...	...	...	...	...
Ilion	5,924	8	.....	1	1	3	...	...	...	...	...	...	...
UTICA	62,934	125	23.8	35	10	35	1	...	...	1	...	...	2
Whitestown	6,895	18	.....	7	1	7	...	...	...	...	...	...	...
ROME	16,562	31	22.5	4	2	12	1	...	...	...	...	...	...
Boonville	3,167	2	.....	0	0	2	...	...	...	...	...	...	...
Camden	3,750	6	.....	0	1	2	...	...	...	...	...	...	...
Waterford	6,000	11	.....	7	0	4	...	...	...	...	...	...	...
Mechanicville	5,877	8	.....	5	0	2	...	...	...	...	...	...	...
Ballston Spa	4,131	6	.....	1	0	4	...	...	...	...	...	...	...
Saratoga Springs	13,000	22	.....	3	0	10	...	...	...	...	...	...	...
Rest of District	181,600	250	16.5	44	14	109	5	1	...	...	...	...	1
Totals for the District	444,740	693	18.7	184	45	244	9	1	...	1	1	...	4
Totals for August, 1905	435,600	586	15.0	136	32	140	9	...	...	...	...	2	3

* Includes Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis counties.

† Includes Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties.

AUGUST, 1906 — (*Continued*).

EASES.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
				1			1				1	2		1						1		
							1	2			1		1					1	2		1	1
				3		2	2	3	1		2	3	2							1	1	
	1		1	27	22	13	37	48	8	3	28	36	16	6	1	1			17	22	34	7
	3	3	4	98	48	59	101	130	21	25	138	116	61	20	12	3	1	3	55	53	67	43
	2		9	88	50	134	128	111	14	9	150	117	51	19	4					38	97	
				2		3	7	1	4	1	8	1	3	1		1			5		3	
				1		2	1	1							1					1		
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						2	1	2			2	1									1	
				1	1	1	3	2	1		10	1	4						6	1		1
				1	2		1	2			2	1		1					1		1	
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						1	2	1			6	2						1	4	3	1	
				1	1	2		3		2	6	1							2		1	
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			1	1				1			1		1							1		
	2		1	26	11	24	44	61	6	4	20	28	19	3	3	2		2	16	22	38	8
1	2		2	34	17	39	65	84	11	7	67	41	31	6	4	3		3	36	29	49	6
	1		2	48	32	71	54	66	13	4	82	65	30	10	9					38	32	
				2	3		8	2	4	4	27	10		2	1	1		2	9	3	4	
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				3	1	2	4	1	1	2	13	4	1		1	1			5	1	6	
							2	1				1							1			
				1	1	1	2	4	1		1	1		1								
1				2		2	4	4			5	1	2						3	2		1
1				1							4	1	1							1	1	
				2		1	1	3				1	1			1			3		2	
				2	2						2	1									1	
				4	3	5	17	19	7	4	15	9	1	5	1				12	3	12	4
				1	2	2	1				7		1			1				2	1	
				3	1	3	6	7	1		5	1			1						1	1
					1			1														
				1		1	2	1													1	
						1					2	1							5	2		
								1			2	1							8		1	
								2				1		1						1		1
						2	2	5		1	3	3	4									2
			3	16	12	8	20	40	2	1	37	26	23	5	1				11	17	19	1
2	1		3	38	26	28	69	91	16	12	124	63	34	14	5	4		3	52	32	50	10
			2	49	26	68	67	60	8	7	93	65	34	5	6					32	50	

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	Ages. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Epidemic Dis[eases]. Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
SOUTHERN TIER DISTRICT.*													
BINGHAMTON	42,036	53	15.1	18	2	14							
Owego	5,010	3		0	0	2							
Candor	3,148	2		0	0	2							
Waverly	4,915	5		1	0	3							
ELMIRA	34,687	59		15	5	22	2						1
Horseheads	4,826	7		3	1	3							
HORNELL	13,259	17	15.4	5	0	8							
Bath	3,700	2		0	0	0							
CORNING	13,515	13	11.5	6	0	0	1						
Wellsville	4,355	6		0	1	3							2
OLEAN	10,163	15	17.7	4	1	5	1						
Salamanca	5,455	3		2	0	0							
DUNKIRK	15,250	31	24.4	12	4	7	1					1	
JAMESTOWN	26,160	28	12.9	4	3	11	2						
Westfield	2,823	3		1	1	0					1		
Fredonia	5,148	3		2	0	1							
Rest of District	244,500	277	13.6	29	20	150	3	2				2	2
Totals for the District	439,000	527	14.4	102	38	231	10	2			1	3	5
Totals for August, 1905	435,000	549	14.5	83	35	139	9	1			5	6	6
EAST CENTRAL DISTRICT.†													
SYRACUSE	117,500	167	17.1	56	7	48					1		
Baldwinsville	2,961	5		2	0	1	1						
DeWitt	6,252	5		4	0	0							
CORTLAND	11,272	22	23.4	8	2	7						2	
Homer	2,536	7		2	1	4							
ONEIDA	8,420	9	12.8	2	0	2							
Hamilton	3,614	1		0	0	1							
Cazenovia	3,557	5		1	0	2							
Canastota	3,244	8		2	1	2							
Norwich	7,115	10		0	0	6							1
Oneonta	8,054	9		1	0	3	1						
Worcester	2,328	0		0	0	0							
Cooperstown	2,446	3		0	0	2							
Walton	5,000	4		0	0	3							
Sidney	4,319	7		1	0	4							
Liberty	5,483	22		1	0	5							
Rest of District	220,100	270	14.7	31	19	185	4					4	2
Totals for the District	414,200	554	16.1	111	30	225	6				1	6	3
Totals for August, 1905	414,500	529	15.0	104	26	103	5	3					
WEST CENTRAL DISTRICT.‡													
AUBURN	31,422	66	25.2	23	4	16							
ITHACA	14,615	20	16.4	4	0	8							
Hector	3,588	5		0	0	3							
Waterloo	4,123	4		1	0	2							
Seneca Falls	6,733	11		1	0	5							
GENEVA	12,249	20	19.6	6	0	5							
Canandaigua	7,332	18		4	3	8				1			
Manchester	4,809	7		2	0	1					1		

* Includes Chautauqua, Cattaraugus, Allegany, Steuben, Chemung, Tioga and Broome counties.
† Includes Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties.
‡ Includes Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties.

AUGUST, 1906 — (*Continued*).

...EASES. Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
				4	2	1	11	5			11	4	5	1					4	1	3	1
							1							1						1		
								1												1		
							2	1			1										1	
				2	1	8	2	5	1	3	14	2	5						4	2	7	
							1	1			1								2		2	
	1				2	2		2			2	2					1		3	1	1	
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						2	2	1			4	1									1	1
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					1	1	1	1			3	2						1		1	3	
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				2		5		2	1		10	3		1					2	2	1	
				1	3	3	1	3	1		3	1	2	2					2	2	2	
																			1		1	
								1			2											
	1		1	11	22	21	46	48	1	7	39	3	11	5	2	2			9	13	22	4
	2		1	20	32	44	68	73	4	10	90	18	25	10	2	2	1	1	28	24	45	6
	3		3	42	37	75	47	78	7	8	50	57	25	8	3					37	42	
				11	9	10	16	19	3	1	38	13	10	2		1		1	9	5	13	5
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						1					1								3			
					2	1	1	1	1		5		4		1				2		1	1
					1	2		2			1										1	
						2						2		1					2	1	1	
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						1	1				1		1								1	
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				1	1	1	2	3					1									
				1	1		2					1	1					1			1	
							1	1				1										
							3	1														
					1			2					1						1	1	1	
				13	1	2	1	2			1	1									1	
1				15	9	19	33	38	4	5	18	27	9	11	2	2		2	13	30	22	
1				41	25	40	60	69	9	6	68	45	28	15	3	4		4	32	38	44	6
	1		1	51	26	71	57	78	12	2	50	46	37	13	3						34	
			1	5	3	4	1	5		1	16	9	5	3					6	1	4	2
				2	1	2	2	1			5	1	2	1	1						2	
					1	1		1					1							1		
						1	1	1			1											
							2	2				3							1		3	
				1				1		2	3	4							2	4	2	1
						1	2	1	1		6	2								2	2	
						1		2	1		1	1										

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	AGES. Deaths 1 to 5 years of age.	AGES. Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
WEST CENTRAL DIST.—(*Con.*)													
Phelps	4,757	6	.....	2	0	4	...	...	...	...	...	...	...
Penn Yan	4,504	9	.....	0	1	6	1	...	...	...	...	...	...
Batavia	10,080	17	.....	3	1	8	...	...	...	...	...	...	...
Dansville	3,908	3	.....	0	0	2	...	...	...	...	...	...	...
Le Roy	3,400	5	.....	2	0	1	...	...	...	...	...	...	...
Warsaw	4,469	4	.....	1	0	2	1	...	...	...	...	...	...
Rest of District	199,400	227	13.7	30	4	130	2	...	...	...	...	1	...
Totals for the District	315,700	422	16.0	79	13	201	4	...	...	1	1	1	...
Totals for August, 1905	320,600	435	15.6	72	33	138	6	...	...	...	1	5	4
LAKE ONTARIO AND WESTERN DISTRICT.*													
BUFFALO	376,587	641	20.4	221	50	132	8	..	...	...	...	3	1
TONAWANDA	7,904	7	10.6	4	0	1	...	...	...	...	...	...	...
Amherst	4,500	5	.....	1	0	3	...	...	...	...	...	...	...
NORTH TONAWANDA	10,197	18	21.2	7	3	3	...	...	...	...	...	...	...
LOCKPORT	17,552	19	13.0	8	0	7	...	...	...	...	...	...	...
NIAGARA FALLS	26,560	56	25.3	25	6	4	5	...	...	...	...	3	...
Medina	5,114	8	.....	0	1	4	...	...	...	...	...	...	...
Albion	5,174	6	.....	2	0	3	...	...	...	...	...	...	...
Brockport	3,627	2	.....	0	0	1	...	...	...	...	...	...	...
ROCHESTER	181,666	243	16.1	70	9	69	1	...	...	...	1	1	3
Palmyra	4,042	4	.....	1	0	1	...	...	...	...	...	...	...
Newark	4,554	5	.....	0	0	0	...	...	...	...	...	...	...
Lyons	4,758	5	.....	1	0	2	...	...	...	...	...	...	...
Clyde	2,552	0	.....	0	0	0	...	...	...	...	...	...	...
OSWEGO	22,572	36	19.1	14	2	9	1	...	...	...	...	...	...
FULTON	8,847	6	8.1	1	0	4	1	...	...	...	...	...	...
Richland	3,611	2	.....	0	0	2	...	...	...	...	...	...	...
Rest of District	257,500	332	15.5	88	31	119	2	...	...	8	...	1	2
Totals for the District	947,500	1,395	17.8	443	102	364	18	...	...	8	1	8	6
Totals for August, 1905	945,200	1,279	15.6	338	264	238	23	...	...	1	3	21	15
Totals for the State	8,198,500	12,456	18.2	3,612	1,061	2,905	158	11	...	37	20	89	104
Average for past five years	....	10,987	17.0	3,090	2,890	1,537	161	19	10	38	36	87	151
Totals for August, 1905	7,918,000	11,754	17.6	3,206	1,296	1,715	189	15	1	43	18	...	127

* Includes Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

AUGUST, 1906 — (*Concluded*).

EASES.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
....	....	....	....	....	1	....	2	....	....	....	1	....	....	....	....	1	....	....	....	1	....	....
....	....	....	....	....	....	2	1	1	....	2	....	....	....	....	....	....	....	....	....	....	2	....
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....	....	....	....	....	....	....	1	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....
....	....	....	....	10	15	14	33	40	4	1	15	18	7	8	1	1	....	1	11	22	21	2
....	....	....	1	19	25	27	49	58	6	6	54	40	16	12	2	2	....	1	21	32	39	5
....	1	....	....	31	18	64	56	60	10	5	49	44	14	4	....	....	....	....	....	39	24	....
....	1	....	....	38	27	47	50	57	16	14	181	50	16	18	11	....	....	....	22	26	55	....
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....	....	....	....	....	....	....	....	....	1	....	....	1	1	....	....	....	....	....	....	2	....	....
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....	....	....	....	....	....	1	3	1	....	1	7	2	....	....	....	....	....	....	....	....	3	1
....	....	....	2	....	2	4	3	....	1	....	9	3	2	1	....	1	....	1	8	1	8	2
....	....	....	....	1	....	....	1	2	1	....	....	....	....	....	....	....	....	....	....	1	2	....
....	....	....	....	....	....	....	....	....	....	....	2	1	....	1	....	1	....	....	....	1	....	....
....	....	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	1	1	15	14	18	18	29	5	5	51	23	10	3	3	....	....	5	11	7	14	4
....	....	....	....	1	....	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
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....	....	....	....	....	....	....	1	....	....	....	....	2	....	1	....	....	....	....	....	....	....	1
....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....
....	....	....	6	13	13	21	30	34	6	8	60	31	17	4	....	....	....	1	22	18	29	6
1	1	1	10	73	58	96	116	131	31	29	326	115	47	29	14	3	....	7	69	58	123	16
....	....	....	6	93	79	185	118	124	29	18	192	109	69	21	12	....	....	....	....	67	94	....
5	22	36	24	1,074	526	710	975	1,135	520	240	2339	928	703	234	106	49	13	62	711	367	963	295
....	15	....	68	1,050	474	1,591	969	....	161	439	1345	737	537	194	83	....	....	....	....	340	721	....
....	18	....	95	1,090	535	1,655	962	1,083	541	136	2134	919	672	158	98	....	....	....	....	367	772	....

VITAL STATISTICS

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns in

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
MARITIME DISTRICT.*													
City of New York:													
BOROUGH OF MANHATTAN	2,174,335	3,170	17.5	1,014	277	487	41	2	...	12	7	18	24
BOROUGH OF THE BRONX	290,097	465	19.2	111	32	87	5	...	...	4	...	...	3
BOROUGH OF BROOKLYN	1,404,569	1,925	16.4	562	188	267	31	6	...	1	6	9	35
BOROUGH OF QUEENS	209,685	330	18.9	106	27	60	6	...	...	...	...	4	4
BOROUGH OF RICHMOND	74,173	131	21.2	41	7	35	1	...	...	...	...	1	1
Totals	4,152,860	6,021	17.4	1,834	531	936	84	8	...	17	13	32	67
Oyster Bay	20,545	25	....	2	2	13	...	...	...	...	...	...	...
Hempstead	34,746	42	....	12	3	11	...	1	...	...	...	...	3
North Hempstead	14,163	29	....	9	2	9	1	...	...	...	...	2	2
Southold	8,989	9	....	3	0	4	...	...	...	...	...	...	...
Sag Harbor	3,048	2	....	2	0	0	...	...	...	...	...	...	...
Huntington	10,236	21	....	3	8	7	...	...	...	...	...	...	...
Brookhaven	16,050	24	....	5	3	10	1	...	...	...	...	...	...
YONKERS	61,716	82	15.9	29	9	10	1	1	...	1	1	1	2
Greenburgh	18,635	20	....	7	4	3	1	...	...	...	...	...	...
MOUNT VERNON	25,006	29	13.9	10	5	9	...	...	...	1	...	...	...
Port Chester	11,198	19	....	6	6	1	...	1	...	...	...	...	1
Ossining	7,135	18	....	2	2	7	1	1	...	...	...	...	2
NEW ROCHELLE	20,480	28	16.4	7	3	6	1	...	...	...	...	...	...
Peekskill	13,200	25	....	5	4	7	1	...	...	...	...	...	...
White Plains	11,579	21	....	10	0	4	...	...	...	...	...	...	...
Mamaroneck	5,090	7	....	3	0	3	...	...	...	...	...	...	...
Rest of District	98,264	172	21.0	25	9	60	1	...	...	...	...	...	...
Totals for the District	4,523,940	6,594	17.5	1,974	586	1,100	92	12	...	19	14	35	77
Totals for September, 1905	4,273,767	5,902	16.8	1,553	584	518	97	5	...	17	17	33	80
HUDSON VALLEY DISTRICT.†													
ALBANY	100,000	135	16.2	20	7	54	...	...	...	...	1	1	5
COHOES	24,183	37	18.4	10	2	6	...	...	...	...	...	1	...
TROY	76,910	134	20.9	31	6	40	3	...	...	...	...	3	...
WATERVLIET	14,600	14	11.5	3	1	2	...	...	...	...	...	...	...
Green Island	4,878	5	....	1	1	1	2	...	...	...	...	...	...
Hoosick Falls	5,251	5	....	3	0	1	...	...	...	...	...	...	...
RENSSELAER	10,715	10	11.2	1	0	6	...	...	...	...	...	...	...
Coxsackie	4,317	3	....	0	1	2	...	...	...	...	...	...	...
Catskill	5,294	12	....	1	1	3	...	...	...	...	...	...	2
HUDSON	10,290	20	23.3	4	1	7	2	1	...	...	...	...	...
KINGSTON	25,556	54	25.3	7	8	19	1	...	...	...	...	...	...
Ellenville	2,872	2	....	0	0	2	...	...	...	...	...	...	...
Marbletown	3,000	5	....	1	0	4	...	...	...	...	...	...	...
Rosendale	4,670	8	....	4	2	0	...	...	...	...	...	...	...
Esopus	4,786	10	....	3	0	4	...	...	...	...	...	...	...
Saugerties	3,833	6	....	2	0	3	...	...	...	...	...	...	...
POUGHKEEPSIE	25,379	25	11.8	4	0	7	1	1	...	...	...	...	...
Fishkill	13,183	26	....	4	7	2	...	...	...	...	...	...	5
Wappingers Falls	3,588	6	....	2	0	2	...	...	...	...	...	...	...
NEWBURG	26,500	44	19.9	8	3	12	4	...	...	...	...	1	...
Port Jervis	9,700	11	....	1	2	2	2	...	...	...	...	2	...
MIDDLETOWN	14,516	17	14.2	4	2	5	...	...	...	...	...	1	...
Warwick	6,690	10	....	1	2	3	...	...	...	...	...	...	...
Goshen	5,023	9	....	1	0	2	...	...	...	...	...	...	...
Montgomery	6,652	4	....	1	1	0	...	...	...	...	...	...	1

* Includes Greater New York, Long Island [Nassau and Suffolk counties] and Westchester county.
† Includes Rockland, Putnam, Orange, Dutchess, Ulster, Greene, Columbia, Albany and Rensselaer counties.

FOR SEPTEMBER, 1906.

Roman type; Populations estimated to date printed in full faced figures.

EASES.																						
Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years.)	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
...	6	20	...	322	144	189	206	278	283	49	537	177	216	46	16	1	8	25	187	80	216	96
...	...	5	...	106	15	23	30	42	31	7	48	20	34	9	4	...	...	5	30	4	31	9
2	2	8	...	199	68	102	138	153	161	56	334	121	131	22	21	7	3	28	94	33	117	37
...	...	2	...	27	11	13	21	28	21	1	69	19	19	5	4	1	4	...	17	3	43	8
...	1	2	...	16	5	1	8	12	8	1	18	7	5	7	2	1	...	...	13	3	9	9
2	9	37	...	670	243	328	402	513	504	114	1006	344	405	89	47	25	15	58	341	73	416	159
...	...	...	...	1	2	2	5	4	...	...	2	2	...	...	1	1	...	...	1	1	3	...
...	...	...	1	2	3	2	5	6	...	...	7	4	...	3	...	...	...	1	1	...	1	2
...	...	...	...	1	...	2	5	3	1	...	1	4	1	1	...	...	...	...	3	1	1	...
...	...	...	...	...	...	...	2	3	...	...	1	2	...	...	...	...	...	...	1	...	...	...
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...	...	...	...	3	...	2	4	3	1	...	2	1	3	...	...	...	...	...	1	...	...	1
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...	...	...	...	5	3	5	7	6	2	3	18	7	4	1	2	...	...	...	5	...	7	...
...	...	...	...	...	1	...	3	5	1	...	3	1	...	...	...	...	...	...	3	...	2	...
...	...	...	1	1	...	3	4	1	...	1	4	2	5	1	...	...	...	...	4	...	1	...
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...	...	...	...	4	1	...	3	2	...	2	3	1	1	...	...	...	...	...	1	...	3	3
...	...	...	...	1	...	1	4	1	...	2	3	2	2	...	...	...	...	...	3	...	2	...
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...	...	...	...	17	10	5	29	20	6	6	18	13	14	2	1	2	...	1	8	5	11	3
2	9	37	2	709	265	357	485	576	521	129	1083	387	443	97	52	29	15	60	378	83	454	172
...	2	...	54	674	283	1,051	460	515	414	84	805	339	425	50	61	...	...	...	...	68	418	...
...	...	1	1	7	9	7	14	26	8	...	4	13	12	4	...	1	...	...	6	3	...	12
...	...	...	...	4	3	3	5	5	1	3	3	1	2	...	...	1	...	...	4	...	1	...
...	...	...	...	13	4	5	14	20	4	14	10	6	12	4	...	...	...	...	12	1	7	2
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...	1	...	...	1	...	1	1	...	...	1	...	2	...	1	1	...	...	...	3	1	6	2
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...	...	...	...	5	2	2	6	2	1	2	4	1	3	2	1	3	...	...	2	1	1	1
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...	...	...	...	1	...	...	4	1	...	...	1	1	2	...	1	...	...	...	2	...	...	3
...	...	...	...	1	1	1	2	1	...	...	2	...	...	...	...	...	...	...	...	...	2	...
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VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
HUDSON VALLEY DIST.—(*Con.*)													
Haverstraw	10,482	1	.....	.....	.....	.....	...	...	...	...	...	...	...
Nyack	4,441	3	.....	1	0	1	...	...	...	...	...	...	...
Ramapo	10,142	7	.....	2	1	3	...	...	...	...	...	...	...
Rest of District	268,000	357	16.0	70	19	137	11	2	...	1	...	4	3
Totals for the District	705,500	980	16.7	190	67	230	26	4	...	1	1	13	16
Totals for September, 1905	696,000	990	17.2	182	58	195	18	1	...	1	2	9	12
ADIRONDACK AND NORTHERN DISTRICT.*													
WATERTOWN	25,447	45	21.2	12	3	10	5	...	...	...	...	2	...
Ellisburgh	3,740	9	.....	2	1	6	...	...	...	...	...	1	...
Carthage	3,404	5	.....	1	1	2	1	...	...	...	...	...	...
Clayton	4,100	3	.....	0	1	0	...	...	...	...	...	...	...
OGDENSBURGH	13,179	21	19.1	3	0	7	3	...	...	...	...	...	...
Gouverneur	6,582	16	.....	10	0	5	...	...	...	...	...	...	...
Potsdam	4,162	5	.....	.....	.....	.....	...	...	...	...	...	...	...
Canton	6,800	14	.....	3	1	6	2	...	...	...	...	...	...
Malone	6,478	2	.....	0	0	2	...	...	...	...	...	...	...
PLATTSBURGH	10,184	11	13.0	5	2	.....	1	...	...	...	...	...	...
Glens Falls	14,650	15	.....	6	0	6	1	...	...	...	...	...	...
Whitehall	4,148	13	.....	5	0	1	1	...	...	...	...	...	1
Fort Edward	5,300	6	.....	3	1	0	...	...	...	...	...	...	...
Sandy Hill	5,321	8	.....	1	0	4	...	...	...	...	...	...	...
Granville	6,487	8	.....	2	0	3	...	...	...	...	...	...	...
Greenwich	4,338	1	.....	.....	.....	.....	...	...	...	...	...	...	...
Lowville	3,921	4	.....	0	0	4	...	...	...	...	...	...	...
Rest of District	279,875	356	15.3	73	30	147	7	...	...	1	1	3	2
Totals for the District	408,116	542	15.9	126	40	203	21	...	...	1	1	6	3
Totals for September, 1905	400,000	544	16.2	120	34	152	9	...	...	3	3	7	2
MOHAWK VALLEY DISTRICT.†													
SCHENECTADY	58,387	81	16.6	30	13	11	1	...	...	...	2	...	1
Cobleskill	3,731	7	.....	0	0	5	...	...	...	...	...	...	...
AMSTERDAM	23,943	22	11.0	6	2	7	...	...	...	...	...	...	1
Fort Plain	2,600	2	.....	0	0	1	1	...	...	...	...	...	...
JOHNSTOWN	9,845	17	20.7	7	0	7	...	...	...	...	...	...	...
GLOVERSVILLE	18,672	17	10.9	2	0	9	...	...	...	...	...	...	...
LITTLE FALLS	11,122	10	10.8	1	0	3	2	...	...	...	...	1	...
Herkimer	6,600	4	.....	1	0	2	...	...	...	...	...	...	...
Ilion	5,924	2	.....	0	0	2	...	...	...	...	...	...	...
UTICA	62,934	105	20.0	31	9	27	4	...	...	...	...	...	6
Whitestown	6,895	12	.....	5	1	2	...	...	...	...	...	1	...
ROME	16,562	20	14.5	8	1	3	1	...	...	...	...	...	...
Boonville	3,167	7	.....	1	0	5	...	...	...	...	...	...	...
Camden	3,750	4	.....	0	0	2	...	...	...	...	...	...	...
Waterford	6,000	5	.....	2	0	2	...	...	...	...	...	...	...
Mechanicville	5,877	12	.....	5	3	1	...	...	...	...	...	...	...
Ballston Spa	4,131	1	.....	0	0	1	...	...	...	...	...	...	...
Saratoga Springs	13,000	21	.....	1	2	8	1	...	...	...	...	...	...
Rest of District	181,600	239	15.8	53	13	103	4	...	...	...	...	2	...
Totals for the District	444,740	588	15.9	153	44	201	14	...	...	...	2	4	8
Totals for September, 1905	435,600	569	16.0	131	33	147	6	...	...	...	4	...	5

*Includes Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis counties.

†Includes Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties

SEPTEMBER, 1906 — (*Continued*).

DISEASES.																						
Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
												1										
							1	1											1			
								3			2								1		1	
2			1	18	19	31	40	44	5	9	47	39	15	3	2	1		1	18	12	23	6
2	1	1	3	67	47	72	111	118	27	36	94	77	55	17	5	8		2	66	23	54	33
	1		4	111	46	119	126	118	19	26	73	94	77	15	4					34	80	
				3	2	3	6	1	3		8	4	4	2						2		
					1		3	1	1			1							1			
					1									1					1	1		
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				1	4	3		2	2		2	1	1							2		
					2				1		6	1		1					3		1	1
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				1		1		3				2			1			1	2	1		
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						2					3								1		2	2
					1		2	2			2	2	1					1	3			
				1	1		1		1	1	4								1		1	
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				1	2		2	1						1					1			
				1	1						1	1	1						1	1		1
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	1			15	16	29	42	51	7	8	37	53	8	5	5			2	21	19	17	6
	1			25	31	38	57	64	16	9	66	67	16	10	6			4	37	30	22	11
			2	48	23	64	56	68	12	10	71	59	24	6	6					38	33	
			1	8	2	4	8	4	6	3	15	5	1	1	1	1			8	2	6	1
				1			2	1				1	1								1	
				1	2	1		3		1	4		2					1	1	2	3	
							1															
				2	2		4				3	1							4			1
					4			1	1	1		2	4			1					2	1
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				9	3	6	4	13	2		20	7	5	4		1			12	3	5	1
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	1		4	38	29	36	50	60	16	9	87	54	31	12	6	7		1	45	24	40	10
	1		6	46	28	76	72	50	27	17	62	51	33	3	2					46	34	

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
SOUTHERN TIER DISTRICT.*													
BINGHAMTON	42,036	63	18.0	19	3	21	1	...	...	...	...	...	1
Owego	5,010	8	.....	1	.....	3	...	...	...	...	...	...	...
Candor	3,148	4	.....	1	1	2	...	...	...	...	...	...	...
Waverly	4,915	6	.....	2	2	1	...	...	...	...	...	...	...
ELMIRA	34,687	41	14.2	3	1	15	2	...	...	...	...	1	...
Horseheads	4,826	10	.....	2	0	6	...	...	...	...	...	...	...
HORNELL	13,259	18	16.3	6	0	5	...	...	...	...	...	...	...
Bath	3,700	5	.....	0	0	5	...	...	...	...	...	...	...
CORNING	13,515	24	21.3	8	0	7	3	...	...	...	...	...	...
Wellsville	4,355	6	.....	1	0	3	...	...	...	...	1	...	...
OLEAN	10,163	17	20.1	7	0	5	...	...	...	...	...	...	...
Salamanca	5,455	3	.....	0	2	0	...	...	...	...	...	...	...
DUNKIRK	15,250	27	21.2	11	6	5	...	...	...	...	...	...	...
JAMESTOWN	26,160	25	11.5	10	1	4	2	...	...	...	...	...	...
Westfield	2,823	6	.....	0	2	1	...	...	...	...	...	...	...
Fredonia	5,148	6	.....	3	1	2	...	...	...	...	...	...	...
Rest of District	244,500	328	16.1	51	21	149	12	...	...	...	...	1	3
Totals for the District	439,000	597	16.3	125	40	234	20	...	...	...	1	2	4
Totals for September, 1905	435,000	515	14.5	72	34	191	9	1	...	...	1	6	8
EAST CENTRAL DISTRICT.†													
SYRACUSE	117,500	157	16.0	36	7	48	1	...	...	...	...	1	1
Baldwinsville	2,961	7	.....	0	0	3	...	...	...	...	...	...	...
DeWitt	6,252	5	.....	1	0	1	...	...	...	...	...	...	...
CORTLAND	11,272	9	9.6	2	1	3	...	...	...	...	...	...	...
Homer	2,536	2	.....	0	0	1	...	...	...	...	...	...	...
ONEIDA	8,420	15	21.3	3	0	3	1	...	...	...	...	...	1
Hamilton	3,614	4	.....	0	0	3	...	...	...	...	...	...	...
Cazenovia	3,557	2	.....	0	0	2	...	...	...	...	...	...	...
Canastota	3,244	3	.....	0	0	1	...	...	...	...	...	...	...
Norwich	7,115	14	.....	3	0	7	...	...	...	...	...	...	...
Oneonta	8,054	13	.....	1	0	6	...	...	...	...	1	...	...
Worcester	2,328	1	.....	.....	.....	1	...	...	...	...	...	...	...
Cooperstown	2,446	4	.....	0	1	1	...	...	...	...	...	...	...
Walton	5,000	5	.....	0	0	4	...	...	...	...	...	...	...
Sidney	4,319	8	.....	2	0	5	...	...	...	...	...	...	...
Liberty	5,483	18	.....	1	3	4	...	...	...	...	...	...	...
Rest of District	220,100	262	14.3	52	15	127	2	1	...	...	...	2	3
Totals for the District	414,200	529	15.3	101	27	220	4	1	...	...	1	3	5
Totals for September, 1905	414,500	492	14.5	91	25	127	9	...	...	1	2	1	3
WEST CENTRAL DISTRICT.‡													
AUBURN	31,422	45	17.2	15	2	12	1	...	...	...	...	1	...
ITHACA	14,615	12	10.0	1	0	8	...	...	...	...	...	...	...
Hector	3,888	10	.....	2	0	5	1	...	...	...	...	...	...
Waterloo	4,123	3	.....	1	0	2	...	...	...	...	...	...	...
Seneca Falls	6,733	16	.....	7	1	7	...	...	...	...	...	...	...
GENEVA	12,249	13	12.7	2	1	3	...	...	...	...	...	...	1
Canandaigua	7,332	12	.....	2	0	8	...	...	...	...	...	...	...
Manchester	4,809	7	.....	1	0	4	...	...	...	...	...	...	...

* Includes Chautauqua, Cattaraugus, Allegany, Steuben, Chemung, Tioga and Broome counties.
† Includes Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties.
‡ Includes Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties.

SEPTEMBER, 1906 — (*Continued*).

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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1	...	...	1	18	18	23	49	49	4	6	38	24	15	9	2	1	...	3	13	11	20	7
1	...	...	1	32	30	46	81	66	11	12	83	47	25	16	4	2	...	5	33	26	35	14
...	1	...	2	22	36	38	68	80	14	7	49	64	22	6	...	...	...	...	...	44	37	...
...	...	...	1	16	13	7	12	19	2	4	12	6	12	4	2	1	1	2	19	5	13	3
...	...	...	...	2	2	...	1	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...
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1	...	...	1	5	17	22	31	32	6	5	34	20	14	7	1	3	...	...	20	17	16	2
1	...	...	2	33	35	34	58	67	12	11	56	35	34	12	3	5	1	2	41	29	36	8
...	...	...	2	51	27	54	58	61	14	8	48	49	13	8	1	...	...	...	...	39	43	...
...	...	...	...	3	1	2	4	5	3	...	8	2	3	2	2	1	...	...	5	1	1	...
...	...	...	...	1	2	3	...	2	...	...	...	1	1	...	...	1	...	...	...	...	...	1
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VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
WEST CENTRAL DIST.—(*Con*).													
Phelps	4,757	4	.....	1	0	3	...	...	...	...	...	...	...
Penn Yan	4,504	13	.....	2	0	4	1	...	...	...	...	...	...
Batavia	10,080	20	.....	1	0	13	...	...	...	...	...	...	1
Dansville	3,908	4	.....	1	0	1	...	...	...	...	...	...	...
Le Roy	8,400	6	.....	4	0	1	...	...	...	...	...	...	...
Warsaw	4,469	7	.....	0	0	2	...	...	...	...	...	...	...
Rest of District	199,400	255	15.3	42	14	113	6	1	...	...	...	...	1
Totals for the District	315,700	427	16.1	82	18	186	9	1	...	...	...	1	3
Totals for September, 1905	320,600	395	15.2	51	23	145	8	...	...	...	...	3	1
LAKE ONTARIO AND WESTERN DISTRICT.*													
BUFFALO	376,587	544	17.3	67	46	115	16	...	...	1	1	4	3
TONAWANDA	7,904	11	16.7	2	0	4	1	...	...	...	...	...	...
Amherst	4,500	3	.....	1	0	2	...	...	...	...	...	...	...
NORTH TONAWANDA	10,197	2	23.5	0	0	1	1	...	...	...	...	...	...
LOCKPORT	17,552	21	14.3	5	3	8	2	...	...	...	...	...	1
NIAGARA FALLS	26,560	36	16.3	11	5	8	3	...	...	...	...	4	...
Medina	5,114	1	.....	0	0	0	...	...	...	...	...	...	...
Albion	5,174	1	.....	0	0	1	...	...	...	...	...	...	...
Brockport	3,627	5	.....	0	0	3	...	...	...	...	...	...	...
ROCHESTER	181,666	222	14.7	42	21	63	3	...	...	...	2	...	4
Palmyra	4,042	11	.....	1	0	9	...	...	...	...	...	...	...
Newark	4,554	8	.....	3	0	1	1	...	...	...	...	...	...
Lyons	4,758	3	.....	3	0	0	...	...	...	...	...	...	...
Clyde	2,552	11	.....	4	1	4	...	...	...	...	...	...	...
OSWEGO	22,572	30	16.0	12	2	4	2	...	...	...	...	1	1
FULTON	8,847	12	16.3	3	1	4	...	...	...	...	...	...	...
Richland	3,611	6	.....	1	0	4	...	...	...	...	...	...	...
Rest of District	257,500	381	17.8	104	23	149	7	...	...	...	...	1	1
Totals for the District	947,500	1,308	16.5	259	102	380	36	...	...	1	3	10	10
Totals for September, 1905	945,000	1,173	15.1	300	82	246	22	2	...	2	5	11	14
Totals for the State	8,198,500	11,565	16.9	3,010	924	2,754	222	18	...	22	23	74	126
Average for past five years	....	10,058	15.9	2,439	882	1,567	183	22	3	17	32	59	167
Totals for September, 1905	7,918,000	10,580	16.0	2,480	873	1,721	178	9	...	24	34	70	125

* Includes Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

SEPTEMBER, 1906 — (*Concluded*).

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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3	....	....	1	22	22	34	54	63	6	7	50	45	22	6	4	3	....	1	22	15	26	7
....	....	....	1	26	28	38	49	52	4	4	46	55	26	1	2	....	....	....	....	32	19	....
....	....	3	....	40	26	84	46	63	19	13	61	35	17	18	13	....	....	....	27	20	34	....
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....	1	....	1	9	19	24	37	37	9	15	69	34	19	9	2	....	....	2	31	14	34	6
....	1	3	5	71	67	129	109	134	42	36	174	109	58	35	18	3	....	7	82	53	93	19
....	2	....	5	78	55	164	117	125	27	28	156	109	65	49	8	....	....	....	....	58	71	....
9	13	41	18	997	526	746	1,005	1,148	650	249	1693	821	684	205	98	57	16	82	704	283	760	274
....	13	....	49	986	435	1,527	980	932	560	509	1375	697	506	734	72	....	....	....	....	387	653	....
....	7	....	76	1,056	476	1,604	1,006	1,069	531	184	1310	820	685	138	84	....	....	....	....	359	735	....

VITAL STATISTICS

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns in

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
MARITIME DISTRICT.*													
City of New York:													
BOROUGH OF MANHATTAN	2,174,335	3,079	17.0	776	254	437	60	6	...	5	5	22	34
BOROUGH OF THE BRONX	290,097	461	19.1	70	32	63	4	...	...	2	1	5	7
BOROUGH OF BROOKLYN	1,404,569	1,913	16.3	422	183	349	35	3	...	4	7	19	49
BOROUGH OF QUEENSD	209,685	300	17.2	64	22	65	2	...	...	...	...	1	13
BOROUGH OF RICHMOND	74,173	100	16.2	29	7	14	3	...	...	...	1	...	3
Totals	4,152,860	5,853	16.9	1,361	496	928	104	9	...	11	14	47	106
Oyster Bay	20,545	31	.....	5	0	14	...	...	...	...	...	...	...
Hempstead	34,746	30	.....	4	1	13	...	...	...	...	...	...	2
North Hempstead	14,163	23	.....	1	0	9	1	...	...	...	...	...	...
Southold	8,989	8	.....	2	0	4	...	...	...	...	...	...	...
Sag Harbor	3,048	2	.....	0	0	2	...	...	...	...	...	...	...
Huntington	10,236	9	.....	1	0	5	...	...	...	...	...	1	...
Brookhaven	16,050	20	.....	5	1	9	...	...	...	...	...	1	1
YONKERS	61,716	81	15.7	18	7	18	...	...	...	...	...	...	1
Greenburgh	18,635	25	.....	3	3	8	...	...	...	...	...	1	1
MOUNT VERNON	25,006	28	13.4	8	4	9	1	...	...	1	...	2	...
Port Chester	11,198	9	.....	0	1	4	...	1	...	...	...	...	...
Ossining	7,135	16	.....	2	0	7	1	...	...	...	...	...	2
NEW ROCHELLE	20,480	23	13.5	6	4	6	...	...	...	...	...	2	...
Peekskill	13,200	23	.....	4	5	5	...	1	...	...	...	...	...
White Plains	11,579	19	.....	0	0	19	...	...	...	...	...	...	...
Mamaroneck	5,090	6	.....	2	0	0	...	...	...	...	...	...	...
Rest of District	98,264	163	19.9	16	8	71	...	1	...	...	...	...	1
Totals for the District	4,523,940	6,369	17.0	1,438	532	1,131	107	12	...	12	14	54	114
Totals for October, 1905	4,278,767	5,672	15.7	1,250	492	584	78	4	...	13	20	24	100
HUDSON VALLEY DISTRICT.†													
ALBANY	100,000	141	16.9	12	3	62	...	...	...	...	...	...	1
COHOES	24,183	42	21.0	12	2	10	1	...	...	...	...	...	...
TROY	76,910	131	20.4	21	3	40	2	...	...	...	...	2	...
WATERVLIET	14,600	25	20.5	7	2	6	...	...	...	...	...	...	1
Green Island	4,878	8	.....	1	0	2	2	...	...	...	...	...	...
Hoosick Falls	5,251	8	.....	1	1	3	...	...	...	...	...	...	1
RENSSELAER	10,715	14	15.7	4	0	6	...	...	...	...	...	...	...
Coxsackie	4,317	7	.....	1	0	1	1	...	...	...	...	...	...
Catskill	5,294	9	.....	3	0	2	...	...	...	...	...	...	1
HUDSON	10,290	17	19.8	5	2	4	...	...	...	...	...	...	1
KINGSTON	25,556	49	23.0	7	3	19	...	...	...	...	...	...	...
Ellenville	2,872	4	.....	0	0	3	...	...	...	...	...	...	...
Marbletown	3,000	0	.....	0	0	0	...	...	...	...	...	...	...
Rosendale	4,670	4	.....	1	0	2	...	...	...	...	...	...	...
Esopus	4,786	9	.....	0	0	6	1	...	...	...	...	...	...
Saugerties	3,833	1	.....	0	0	1	...	...	...	...	...	...	...
POUGHKEEPSIE	25,379	44	21.0	6	1	17	2	...	...	...	...	...	2
Fishkill	13,183	18	.....	2	1	7	...	...	...	...	...	...	...
Wappingers Falls	3,588	1	.....	0	0	0	...	...	...	...	...	...	...
NEWBURG	26,500	43	19.4	10	1	15	1	...	...	...	...	...	...
Port Jervis	9,700	10	.....	0	1	5	...	...	...	...	...	...	...
MIDDLETOWN	14,516	10	8.3	5	0	2	...	...	...	...	...	...	...
Warwick	6,690	8	.....	0	0	5	...	...	...	...	...	...	1
Goshen	5,023	13	.....	2	1	9	...	...	...	...	...	...	...
Montgomery	6,652	7	.....	0	0	4	1	...	...	...	...	...	...

* Includes Greater New York, Long Island [Nassau and Suffolk counties] and Westchester county.
† Includes Rockland, Putnam, Orange, Dutchess, Ulster, Greene, Columbia, Albany and Rensselaer counties.

FOR OCTOBER, 1906.

Roman type; Populations estimated to date printed in full faced figures.

EASES.																						
Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
1	7		25	367	142	181	233	201	365	91	273	172	212	56	25	14	1	20	191	27	188	75
			4	129	15	25	25	43	45	6	19	27	27	5	7	1		5	23	6	23	7
2	5		7	204	100	77	141	197	215	57	182	111	174	10	20	5	5	21	112	34	105	12
			2	32	10	6	20	35	33	6	24	12	16	5	1		1		20	10	46	5
			1	11	3	4	11	4	7	1	8	4	11	2		1	1	1	11	2	5	5
3	12		39	733	270	293	430	570	665	161	506	326	440	78	53	21	8	47	357	79	367	104
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				2	5	2	3	3		1	1	1	5	2					2	1		
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				3	1	2	1	3	3		2		3	1						1	1	1
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				17	9	10	32	33	2	13	7	14	5	1					9	4	3	2
5	12		41	777	294	322	501	650	691	184	526	366	464	87	55	22	8	48	390	96	406	111
	6		46	725	269	373	474	557	582	98	466	280	464	63	58					87	395	
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				4	1	2	9	4	2	3	3	4	1	1					4	1	2	1
						2	3	2	1				1	1								
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				1		1	1	2		2		1	2						1	2		
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VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS[EASES]. Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
HUDSON VALLEY DIST.—(*Con.*).													
Haverstraw	10,482	16	....	3	0	5	...	1	...	...	...	...	...
Nyack	4,441	4	....	0	0	3	...	...	...	...	...	...	...
Ramapo	10,142	11	....	4	0	2	...	...	...	...	...	...	...
Rest of District	268,000	369	16.5	51	17	173	7	4	...	...	...	2	4
Totals for the District	705,500	1,023	17.4	158	38	414	18	5	...	...	...	4	12
Totals for October, 1905	696,000	910	15.5	140	48	198	22	1	...	...	2	7	15
ADIRONDACK AND NORTHERN DISTRICT.*													
WATERTOWN	25,447	31	14.6	7	2	10	1	...	...	...	...	1	1
Ellisburgh	3,740	2	....	0	0	1	...	...	...	...	...	...	...
Carthage	3,404	9	....	1	1	2	...	...	...	...	...	...	...
Clayton	4,100	10	....	1	1	6	...	...	...	...	...	...	1
OGDENSBURGH	13,179	24	21.8	3	0	10	...	...	...	...	...	...	...
Gouverneur	6,582	3	....	0	0	2	...	...	...	...	...	...	...
Potsdam	4,162	5	....	0	0	1	...	...	...	...	...	...	...
Canton	6,800	13	....	3	1	4	...	...	...	...	...	...	...
Malone	6,478	11	....	2	1	2	...	...	...	...	...	...	...
PLATTSBURGH	10,184	17	20.0	3	0	8	2	...	...	...	...	...	...
Glens Falls	14,650	22	....	3	2	7	3	...	...	...	...	...	...
Whitehall	4,148	6	....	1	0	2	...	...	...	...	...	...	...
Fort Edward	5,300	7	....	0	0	5	...	...	...	...	...	...	...
Sandy Hill	5,321	5	....	1	0	3	1	...	...	...	...	...	...
Granville	6,487	12	....	3	0	7	...	...	...	...	...	...	...
Greenwich	4,338	5	....	0	0	4	2	...	...	...	...	...	...
Lowville	3,921	10	....	2	0	4	...	...	...	...	...	...	...
Rest of District	279,875	355	15.2	63	14	148	8	1	...	...	...	1	6
Totals for the District	408,116	547	16.1	93	22	226	17	1	...	...	...	2	8
Totals for October, 1905	400,000	483	14.0	90	34	128	14	2	...	...	...	8	6
MOHAWK VALLEY DISTRICT.†													
SCHENECTADY	71,205	87	14.7	23	12	22	1	...	...	...	2	...	4
Cobleskill	3,731	4	....	0	0	3	...	...	...	...	...	...	...
AMSTERDAM	23,943	41	20.6	16	3	9	1	...	...	...	...	...	1
Fort Plain	2,600	6	....	1	0	5	...	...	...	...	...	...	...
JOHNSTOWN	9,845	7	8.5	0	1	1	...	...	...	...	...	...	1
GLOVERSVILLE	18,672	24	15.4	2	0	12	...	...	...	...	...	...	...
LITTLE FALLS	11,122	14	15.1	4	0	4	...	...	...	...	...	...	...
Herkimer	6,600	14	....	4	0	6	1	...	...	...	...	...	...
Ilion	5,924	9	....	2	1	2	...	...	...	...	...	...	...
UTICA	62,934	87	16.5	20	8	30	4	...	...	...	...	...	5
Whitestown	6,895	10	....	1	2	4	...	...	...	...	...	...	1
ROME	16,562	28	20.3	5	2	13	...	...	...	...	...	1	1
Boonville	3,167	5	....	1	0	3	...	...	...	...	...	...	...
Camden	3,750	3	....	1	0	2	...	...	...	...	...	...	...
Waterford	6,000	4	....	3	0	1	...	...	...	...	...	...	...
Mechanicville	5,877	7	....	2	0	1	...	...	...	...	...	...	...
Ballston Spa	4,131	7	....	0	0	4	...	...	...	...	...	...	...
Saratoga Springs	13,000	20	....	1	0	13	1	...	...	...	...	...	...
Rest of District	181,600	248	16.3	31	8	131	6	...	...	...	1	3	3
Totals for the District	444,740	625	16.9	117	37	266	14	...	...	...	3	4	16
Totals for October, 1905	435,600	530	14.5	82	30	125	10	...	...	...	1	5	10

* Includes Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis counties.

† Includes Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties.

OCTOBER, 1906 — (*Continued*).

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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2	1			29	22	16	69	39	11	17	35	33	24	6		2		1	2	15	22	6
2	3		5	82	50	47	161	132	46	52	59	87	63	22	4	3		3	48	32	51	32
	1		6	93	44	115	128	110	45	26	39	61	62	12	12					38	71	
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					1	1														1		
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							3	1	1		2	2	2						2			
				3	1	1	3	1		1	1											
					1	1	2	3			1	1		1					2		2	1
				1	2		3	6				2		2					2		1	
					2			1			1		1								1	
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				1	1				1	1			3		1				2	2		
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					1	2	2	1	1			2								1		
2	1			25	10	29	45	45	9	10	25	84	12	7	3	2		2	20	23	25	10
3	1			35	25	40	73	71	17	16	30	54	21	12	4	2		2	35	35	32	11
	1		3	50	20	63	46	52	16	7	41	53	18	4	5					36	38	
				7	4	3	9	4	5	9	9	6	4	1	1		1		5	2	8	2
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			1		2	1	4	5		5	1	5	1	1					10		3	
							5													1		
				1			1	1	1			1									1	
				3		2	4	5		1	1	1	1							2	3	1
				1			2		1	1	2	3		1					1	1	1	
							1	1	1	2		2							4	2		
				1			1	1	2	1		1							1		1	
1				3	1	5	7	12	8	4	5	8	6	3	1	1			6	2	4	1
						3		1	1					1		1				1	1	
					1		4	5		1		3	6						2	3	1	
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				1		1	2	1				1								1		
				1			2	6	3		1	2	1			1					2	
			1	10	8	13	42	32	17	6	10	27	19	7	1	2			11	10	18	1
1			2	28	17	29	87	76	40	82	31	65	38	14	3	5	1		43	25	46	5
	1		1	56	30	84	58	57	34	9	21	39	42	4	3					33	32	

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
SOUTHERN TIER DISTRICT.*													
BINGHAMTON	42,036	45	12.8	7	2	14	...	...	...	...	...	2	2
Owego	5,010	14	.....	0	0	6	...	...	...	...	...	...	...
Candor	3,148	4	.....	0	0	3	...	...	...	...	...	...	...
Waverly	4,915	6	.....	1	0	4	...	...	...	...	...	...	...
ELMIRA	34,687	46	15.9	5	1	16	...	1	...	...	...	...	3
Horseheads	4,826	1	.....	0	0	0	...	...	...	...	...	...	...
HORNELL	13,259	15	13.5	1	1	7	...	...	...	...	...	1	...
Bath	3,700	3	.....	0	0	2	...	...	...	...	...	...	...
CORNING	13,515	17	15.2	3	1	6	1	...	...	...	...	...	...
Wellsville	4,355	6	.....	0	1	2	...	...	...	...	...	...	...
OLEAN	10,163	13	15.3	1	1	3	...	...	...	...	...	...	...
Salamanca	5,455	8	.....	0	0	3	1	...	...	...	...	...	...
DUNKIRK	15,250	19	15.0	6	1	4	1	...	...	...	...	...	...
JAMESTOWN	26,160	20	9.2	2	1	7	...	...	...	...	...	...	...
Westfield	2,823	8	.....	0	0	5	...	...	...	...	...	...	...
Fredonia	5,148	4	.....	1	1	1	1	...	...	...	...	...	...
Rest of District	244,500	318	15.6	36	17	175	9	...	...	...	...	...	3
Totals for the District	439,000	547	15.0	63	27	258	13	1	...	...	...	3	8
Totals for October, 1905	435,000	526	14.5	66	19	156	13	...	...	...	...	3	10
EAST CENTRAL DISTRICT.†													
SYRACUSE	117,500	133	.....	33	5	44	2	...	...	...	...	...	2
Baldwinsville	2,961	1	.....	0	0	1	...	...	...	...	...	...	...
DeWitt	6,252	0	.....	0	0	0	...	...	...	...	...	...	...
CORTLAND	11,272	15	16.0	1	1	8	1	...	...	...	...	...	...
Homer	2,536	8	.....	2	0	5	1	...	...	...	...	...	...
ONEIDA	8,420	9	12.8	1	1	3	...	...	...	...	...	...	...
Hamilton	3,614	6	.....	0	0	3	...	...	...	...	...	...	...
Cazenovia	3,557	2	.....	0	0	1	...	...	...	...	...	...	...
Canastota	3,244	3	.....	1	0	2	...	...	...	...	...	...	...
Norwich	7,115	6	.....	0	0	5	...	...	...	...	...	...	...
Oneonta	8,054	11	.....	4	0	4	...	...	...	...	...	...	...
Worcester	2,328	7	.....	0	1	3	...	...	...	...	...	...	...
Cooperstown	2,446	1	.....	0	0	1	...	...	...	...	...	...	...
Walton	5,000	5	.....	0	1	2	...	...	...	...	...	...	...
Sidney	4,319	7	.....	1	1	2	...	...	...	...	...	...	...
Liberty	5,483	13	.....	0	3	2	...	...	...	...	...	...	1
Rest of District	220,100	301	16.4	43	11	178	10	...	...	...	...	...	...
Totals for the District	414,200	528	15.3	86	24	264	14	...	...	...	...	...	3
Totals for October, 1905	414,500	525	15.0	66	13	163	17	...	...	...	1	2	1
WEST CENTRAL DISTRICT.‡													
AUBURN	31,422	52	19.8	13	1	12	...	...	...	...	...	...	...
ITHACA	14,615	19	15.6	0	1	10	...	...	...	...	...	...	...
Hector	3,888	3	.....	0	0	3	...	...	...	...	...	...	...
Waterloo	4,123	5	.....	0	1	3	...	...	...	...	...	...	1
Seneca Falls	6,733	9	.....	3	0	4	1	...	...	...	...	...	...
GENEVA	12,249	17	16.7	2	0	7	...	...	...	...	...	...	...
Canandaigua	7,332	11	.....	2	0	4	...	...	...	...	...	...	...
Manchester	4,809	5	.....	1	0	2	...	...	...	...	...	...	...

* Includes Chautauqua, Cattaraugus, Allegany, Steuben, Chemung, Tioga and Broome counties.
† Includes Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties.
‡ Includes Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties.

OCTOBER, 1906 — (*Continued*).

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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2	....	....	1	31	35	37	73	68	20	21	34	36	22	12	1	3	....	...	39	38	31	7
....	...	....	3	51	21	53	82	85	17	11	27	41	28	16	1	...	....	...	....	40	28	..
....	....	....	....	5	3	6	3	6	1	1	8	3	3	1	1	1	....	...	5	....	5	...
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VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES.			EPIDEMIC DIS						
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60. years and over.	Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
WEST CENTRAL DIST.—(*Con.*).													
Phelps	4,757	2	.....	0	0	2	...	...	...	...	...	...	...
Penn Yan	4,504	4	.....	1	0	1	...	...	...	...	...	...	...
Batavia	10,080	11	.....	1	0	7	1	...	...	...	...	...	...
Dansville	3,908	8	.....	1	0	4	...	...	...	...	...	...	...
Le Roy	3,400	2	.....	0	0	1	...	...	...	...	...	...	...
Warsaw	4,469	5	.....	1	0	2	...	...	...	...	...	...	...
Rest of District	199,400	305	18.4	38	15	166	3	1	...	3	...	1	1
Totals for the District	315,700	458	17.4	63	18	228	5	1	...	3	...	1	2
Totals for October, 1905	320,600	466	17.2	74	24	160	9	1	...	...	...	3	3
LAKE ONTARIO AND WESTERN DISTRICT.*													
BUFFALO	376,587	527	16.8	99	38	129	20	...	...	2	1	2	13
TONAWANDA	7,904	6	9.1	1	2	2	...	...	...	...	...	...	...
Amherst	4,500	3	.....	1	0	2	...	...	...	...	...	...	...
NORTH TONAWANDA	10,197	13	15.3	4	2	2	1	...	...	...	...	...	...
LOCKPORT	17,552	31	21.2	5	3	6	3	...	...	...	...	...	3
NIAGARA FALLS	26,560	40	18.1	11	5	6	4	...	...	...	...	1	1
Medina	5,114	9	.....	2	0	7	...	...	...	...	...	...	...
Albion	5,174	7	.....	1	1	4	...	...	...	...	...	...	...
Brockport	3,627	4	.....	1	1	1	...	...	...	...	...	...	...
ROCHESTER	181,666	226	14.9	31	11	74	7	...	...	...	2	1	10
Palmyra	4,042	5	.....	0	1	3	...	...	...	...	...	...	...
Newark	4,554	4	.....	1	0	1	...	...	...	...	...	...	...
Lyons	4,758	9	.....	1	0	4	1	...	...	...	...	...	...
Clyde	2,552	6	.....	0	0	3	...	...	...	...	...	...	...
OSWEGO	22,572	29	15.5	6	2	12	...	...	...	...	...	1	...
FULTON	8,847	11	14.9	4	0	3	2	...	...	...	...	...	...
Richland	3,611	7	.....	0	2	5	...	...	...	...	...	...	...
Rest of District	257,500	330	15.4	66	20	139	6	...	...	...	...	2	[illegible]
Totals for the District	947,875	1,267	16.0	234	88	403	44	...	...	2	3	7	3[illegible]
Totals for October, 1905	945,000	1,110	14.1	198	69	246	35	1	...	1	5	4	16
Totals for the State	8,198,500	11,364	16.6	2,252	786	3,090	232	20	...	17	20	75	195
Average for past five years	....	9,825	15.3	1,356	729	1,695	210	18	3	21	44	45	21[illegible]
Totals for October, 1905	7,918,000	10,222	15.5	1,966	729	1,760	198	9	...	14	29	56	161

* Includes Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

OCTOBER, 1906 — (*Concluded*).

...ASES. Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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...	...	...	...	11	23	18	42	43	14	10	26	33	15	7	...	2	...	...	7	15	28	2
...	...	...	...	22	28	31	58	67	22	15	37	42	27	10	2	3	...	...	20	24	36	2
...	...	...	1	25	28	54	64	56	17	10	40	50	24	8	1	...	...	...	...	51	21	...
...	...	...	1	38	26	51	47	64	38	16	17	59	20	15	12	...	...	...	20	25	40	...
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...	...	...	...	6	2	2	...	2	2	2	2	...	2	1	...	...	...	...	2	1	1	...
1	...	...	...	2	1	1	3	2	1	3	4	1	1	...	...	...	...	...	6	2	3	3
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...	...	...	2	16	19	15	50	39	12	17	37	23	13	10	1	...	...	...	14	8	37	4
1	1	...	6	90	63	85	143	163	66	50	85	108	57	34	14	3	1	...	58	44	94	13
...	...	...	4	94	67	154	122	130	69	23	76	76	65	14	15	...	...	...	...	58	81	...
14	17	...	55	1,090	548	624	1,167	1,308	931	393	828	820	727	204	87	46	11	54	655	316	721	187
	11	...	46	1,072	462	1,440	1,021	1,045	802	667	650	630	549	206	75	...	...	...	...	395	626	...
	10	...	65	1,115	510	1,463	1,041	1,112	805	194	732	653	732	124	95	...	...	...	...	394	710	...

VITAL STATISTICS

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Towns i

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	AGES. Deaths 1 to 5 years of age.	AGES. Deaths at 60 years and over.	EPIDEMIC DI… Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	
MARITIME DISTRICT.*													
City of New York.													
BOROUGH OF MANHATTAN	2,174,335	2,908	16.0	527	251	436	46	2	...	9	11	7	
BOROUGH OF THE BRONX	290,097	460	19.0	62	26	76	9	...	...	5	1	4	
BOROUGH OF BROOKLYN	1,404,569	1,867	16.0	316	151	344	23	1	...	2	9	11	
BOROUGH OF QUEENS	209,685	280	16.0	50	34	72	3	1	...	...	1	2	
BOROUGH OF RICHMOND	74,173	100	16.2	11	7	27	2	...	...	...	...	1	
Totals	4,152,860	5,610	16.2	966	469	955	83	4	...	16	22	25	1
Oyster Bay	20,545	22	....	4	0	7	...	...	...	...	...	...	
Hempstead	34,746	46	....	6	3	22	...	1	...	...	...	...	
North Hempstead	14,163	14	....	1	1	2	...	...	...	...	...	...	
Southold	8,989	3	....	1	0	1	...	...	...	...	...	...	
Sag Harbor	3,048	7	....	0	0	2	...	...	...	...	...	...	
Huntington	10,236	4	....	0	0	1	...	...	...	...	...	...	
Brookhaven	16,050	16	....	2	0	8	1	...	...	...	...	...	
YONKERS	61,716	92	17.9	18	8	15	1	...	...	1	...	...	
Greenburgh	18,635	16	....	3	1	7	...	...	...	...	...	...	
MOUNT VERNON	25,006	32	15.4	5	3	9	...	...	...	...	...	...	
Port Chester	11,198	12	....	2	2	0	...	...	...	...	...	...	
Ossining	7,135	8	....	3	1	1	1	...	...	...	...	...	
NEW ROCHELLE	20,480	26	15.2	5	5	5	...	...	...	...	...	...	
Peekskill	13,200	19	....	7	0	6	...	...	...	...	...	...	
White Plains	11,579	19	....	2	1	6	1	1	...	...	...	...	
Mamaroneck	5,090	4	....	3	0	0	...	...	...	...	...	...	
Rest of District	98,264	160	19.5	14	6	61	...	...	...	...	...	...	
Totals for the District	4,523,940	6,110	16.2	1,042	500	1,108	87	6	...	17	22	25	
Totals for November, 1905	4,359,000	5,791	16.2	948	453	695	53	5	...	40	27	11	
HUDSON VALLEY DISTRICT.†													
ALBANY	100,000	122	14.6	16	7	38	4	...	...	...	...	...	
COHOES	24,183	39	19.4	6	3	12	...	...	...	...	...	1	
TROY	76,910	148	23.1	24	8	56	2	...	...	...	...	...	
WATERVLIET	14,600	22	18.1	2	0	5	...	...	...	...	...	...	
Green Island	4,878	8	....	1	0	2	...	...	...	...	...	...	
Hoosick Falls	5,251	7	....	0	1	3	1	...	...	...	...	...	
RENSSELAER	10,715	15	16.8	0	2	9	...	1	...	...	...	...	
Coxsackie	4,317	1	....	0	0	1	...	...	...	...	...	...	
Catskill	5,294	4	....	1	0	3	...	...	...	...	...	...	
HUDSON	10,290	15	17.5	2	1	6	...	...	...	1	...	...	
KINGSTON	25,556	33	15.5	5	2	12	1	...	...	...	...	...	
Ellenville	2,872	4	....	0	0	4	...	...	...	...	...	...	
Marbletown	3,000	1	....	0	0	1	...	...	...	...	...	...	
Rosendale	4,670	6	....	0	0	2	...	...	...	...	...	...	
Esopus	4,786	3	....	0	0	1	1	...	...	...	...	...	
Saugerties	3,833	6	....	1	1	2	...	...	...	...	...	...	
POUGHKEEPSIE	25,379	37	17.5	2	2	13	1	...	...	...	...	...	
Fishkill	13,183	24	....	5	4	7	...	...	...	...	...	...	
Wappingers Falls	3,588	1	....	0	0	0	...	...	...	...	...	...	
NEWBURG	26,500	46	20.8	8	4	11	...	...	...	...	...	...	1
Port Jervis	9,700	14	....	1	0	3	...	...	...	...	1	...	
MIDDLETOWN	14,516	17	14.1	3	2	7	1	...	...	...	...	...	
Warwick	6,690	6	....	1	1	2	...	...	...	...	...	...	
Goshen	5,023	5	....	1	1	1	...	...	...	...	...	...	1
Montgomery	6,652	12	....	1	1	6	...	...	...	...	...	...	

* Includes Greater New York, Long Island [Nassau and Suffolk counties] and Westchester cou

† Includes Rockland, Putnam, Orange, Dutchess, Ulster, Greene, Columbia, Albany and Rensselaer counties.

FOR NOVEMBER, 1906.

Roman type; Populations estimated to date printed in full faced figures.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
5	17	27	....	356	127	170	201	329	444	85	94	137	211	55	23	18	3	32	150	26	228	28
1	....	2	....	111	20	21	31	47	61	19	7	19	26	7	3	3	....	...	16	6	26	5
2	3	8	....	201	97	91	133	177	304	76	56	96	182	21	21	6	3	31	90	42	106	6
...	....	1	....	32	12	12	32	19	36	7	16	6	22	5	3	2	1	1	22	6	24	1
...	....	2	....	14	8	6	10	10	9	4	1	6	8	....	....	1	1	...	4	2	8	1
12	20	40	....	714	264	300	406	582	854	191	174	264	449	88	50	30	8	64	282	82	392	41
..	...	....	....	1	1	1	2	5	1	3	....	1	1	....	2	....	.....	...	2	....	1	...
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12	20	40	2	760	282	317	473	663	891	230	185	293	479	96	63	32	8	68	316	86	431	43
...	15	....	47	749	269	887	432	605	887	135	140	255	485	79	65	....	.....	...	.....	80	404	...
			2	.....	4	6	21	17	9	7	....	7	10	1	2	....	.....	...	8	3	1	8
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VITAL STATISTICS FO[R]

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC D[ISEASES]. Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	[illegible]
HUDSON RIVER DIST.—(*Con.*).													
Haverstraw	10,482	7	.....	1	0	3	...	...	...	...	...	...	..
Nyack	4,441	10	.....	1	0	3	1	...	...	...	...	...	..
Ramapo	10,142	4	.....	1	0	2	...	...	...	...	...	...	..
Rest of District	268,000	315	14.1	35	15	168	5	1	...	...	...	1	
Totals for the District	705,500	932	15.9	118	55	383	17	2	...	1	1	4	2
Totals for November, 1905	704,658	976	16.7	109	40	243	17	...	...	...	2	8	1
ADIRONDACK AND NORTHERN DISTRICT.*													
WATERTOWN	25,447	44	20.7	7	2	15	3	...	...	...	...	...	
Ellisburgh	3,740	5	.....	1	0	3	...	...	...	...	...	...	..
Carthage	3,404	4	.....	0	0	2	...	...	...	...	...	...	..
Clayton	4,100	2	.....	0	0	1	...	...	...	...	...	...	..
OGDENSBURGH	13,179	30	27.3	1	1	11	3	...	...	...	...	...	..
Gouverneur	6,582	12	.....	1	1	8	1	...	...	...	...	...	..
Potsdam	4,162	4	.....	2	0	1	...	...	...	...	...	...	..
Canton	6,800	5	.....	0	0	3	...	...	...	...	...	...	..
Malone	6,478	7	.....	2	1	2	...	...	...	...	...	...	..
PLATTSBURGH	10,184	11	13.0	3	0	5	...	...	...	...	...	...	..
Glens Falls	14,650	16	.....	0	0	7	...	...	...	...	...	...	
Whitehall	4,148	2	.....	0	0	1	...	...	...	...	...	...	
Fort Edward	5,300	6	.....	0	1	2	2	...	...	...	...	...	..
Sandy Hill	5,321	1	.....	0	0	1	...	...	...	...	...	...	..
Granville	6,487	8	.....	2	0	4	...	...	...	...	...	...	..
Greenwich	4,338	5	.....	1	1	0	...	...	...	...	...	...	..
Lowville	3,921	8	.....	3	0	4	...	...	...	...	...	1	..
Rest of District	279,875	324	13.8	69	16	139	9	1	...	...	1	3	[illegible]
Totals for the District	408,116	494	14.5	92	23	209	18	1	...	...	1	4	[illegible]
Totals for November, 1905	400,586	465	14.0	62	16	139	10	...	...	4	1	8	[illegible]
MOHAWK VALLEY DISTRICT.†													
SCHENECTADY	71,205	50	8.4	13	7	9	1	...	...	1	...	...	[illegible]
Cobleskill	3,731	3	.....	0	0	3	...	...	...	...	...	...	..
AMSTERDAM	23,943	27	13.5	2	2	12	3	...	..	..	...	...	1
Fort Plain	2,600	4	.....	0	0	4	...	...	...	...	...	...	..
JOHNSTOWN	9,845	13	15.8	2	0	8	...	...	...	...	...	...	..
GLOVERSVILLE	18,672	26	16.9	2	1	16	...	...	...	...	...	...	1
LITTLE FALLS	11,122	10	10.8	3	0	2	1	...	...	...	...	...	..
Herkimer	6,600	13	.....	2	1	3	...	...	...	...	...	...	..
Ilion	5,924	6	.....	1	0	0	...	...	...	...	...	...	..
UTICA	62,934	79	15.1	15	2	27	4	2	...	...	...	...	1
Whitestown	6,895	9	.....	5	0	3	...	...	...	...	...	...	..
ROME	16,562	28	.....	5	2	12	1	...	...	...	...	...	..
Boonville	3,167	1	.....	0	0	1	...	...	...	...	...	...	..
Camden	3,750	1	.....	0	0	0	...	...	...	...	...	...	..
Waterford	6,000	8	.....	4	0	2	...	...	...	...	...	1	..
Mechanicville	5,877	10	.....	2	1	4	...	...	...	...	...	...	1
Ballston Spa	4,131	7	.....	1	1	1	...	...	...	...	...	...	..
Saratoga Springs	13,000	22	...	3	1	6	...	...	...	...	...	2	..
Rest of District	181,600	201	13.3	21	6	107	3	...	...	...	...	2	1
Totals for the District	444,740	518	14.0	81	24	220	13	2	...	1	...	5	7
Totals for November, 1905	442,300	584	16.0	85	35	170	12	...	...	1	3	2	8

* Includes Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis counties.

† Includes Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties.

NOVEMBER, 1906 — (*Continued*).

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
							1			1		1	1			1					1	1
				2	2			3										1			1	
									1				2						1			
3			1	18	19	21	54	36	24	16	4	25	19	8	1	2		1	18	17	14	1
4			4	81	49	53	137	106	71	56	11	73	59	22	4	5		2	56	39	40	12
	3		4	103	36	100	134	142	86	38	13	80	50	15	5					53	68	
				1	1	2	3	4	8	2	1	4	2			2			2	2	6	
					1		3												1			
						1	1		1				1									
				1									1									
				4	2	1	2	5	1	1		4	2			1				2	1	1
					1	1		2	1	1	1		1	1					1	1		
						1					1	1							1			
				1			2					1									1	
							1					1		1					1	1	1	1
							1	2	3	1		1	1						2			
				3	1		5	2	1			3										
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					2		2		1	1					1						1	
				1					1	1					1				1			
							2	3		2												
1	2		2	23	12	19	48	39	20	14	18	20	13	6	3			2	30	18	13	5
1	2		2	35	21	28	70	57	37	23	21	35	21	8	5	3		2	39	25	23	7
			2	38	18	62	50	66	30	15	5	33	25	7	4					39	32	
				3	1	2	4	5	7	3		5	2	2				1	3	2	4	2
							1	2														
	1			1	1		5	4	2	1	1	2		1						1	2	1
					1								1							2		
					1	2	1	3		1			2						2			1
				2	2	2	6	4	1	1		1	2	1					1	1		1
					2	1	3			1			1	1								
	1				1	1	1	1	2	2	1	2								1		
				1		1			1			1							1		1	
1				8	4	3	7	2	6	5	1	9	3	2	1	2			6	1	9	2
				1			1			1				2					2	1		1
				1	2		4	2	1	6		1	1	2						3	4	
					1																	
					1																	
				1			2				1		1						1			1
				1			2		1	2		1		1					1			
				1	1				1		1								1	1	1	
				2	1	1	3	2	3	1		2	1	2					1			1
2	1		1	12	17	5	32	32	12	9	3	13	9	4			1	2	9	7	21	8
3	3		1	34	36	18	72	57	37	33	8	37	23	18	1	2	1	3	28	20	42	13
			4	43	29	77	72	81	54	30	12	35	32	10	3					38	38	

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
SOUTHERN TIER DISTRICT *													
BINGHAMTON	42,036	59	16.8	12	3	16	1	1	...	...	...	1	5
Owego	5,010	6	.....	1	0	4	...	...	...	...	...	...	...
Candor	3,148	4	.....	0	0	3	...	...	...	...	...	...	...
Waverly	4,915	7	.....	0	0	5	2	...	...	...	...	...	...
ELMIRA	34,687	39	13.5	8	0	12	1	...	...	...	...	...	...
Horseheads	4,826	3	.....	0	0	2	...	...	...	...	...	...	...
HORNELL	13,259	17	15.4	5	0	6	1	...	...	...	...	...	...
Bath	3,700	4	.....	0	0	1	...	...	...	...	...	...	...
CORNING	13,515	22	19.5	4	1	4	1	...	...	...	...	...	...
Wellsville	4,355	8	.....	1	0	3	2	...	...	...	...	...	...
OLEAN	10,163	18	21.3	2	2	4	...	...	...	...	...	...	1
Salamanca	5,455	4	.....	1	0	0	...	...	...	...	...	...	...
DUNKIRK	15,250	13	10.2	3	0	8	...	...	...	...	...	...	...
JAMESTOWN	26,160	19	8.7	4	0	5	1	...	...	...	...	...	...
Westfield	2,823	1	.....	0	1	0	...	...	...	...	...	...	1
Fredonia	5,148	6	.....	0	0	5	...	...	...	...	...	...	1
Rest of District	244,500	289	14.2	29	7	171	8	...	...	...	...	...	...
Totals for the District	439,000	519	14.2	70	14	249	17	1	...	...	...	1	8
Totals for November, 1905	442,000	497	13.5	48	18	152	12	...	...	...	1	6	7
EAST CENTRAL DISTRICT.†													
SYRACUSE	117,500	142	14.5	24	7	48	3	...	...	...	...	...	1
Baldwinsville	2,961	2	.....	0	0	0	...	...	...	...	...	...	...
DeWitt	6,252	9	.....	0	1	3	...	...	...	...	...	...	...
CORTLAND	11,272	10	10.6	3	1	1	...	...	...	...	...	1	1
Homer	2,536	4	.....	1	0	2	1	...	...	...	...	...	...
ONEIDA	8,420	10	14.3	2	0	5	...	...	...	...	...	...	...
Hamilton	3,614	5	.....	1	1	1	...	...	...	...	...	...	...
Cazenovia	3,557	4	.....	0	1	3	...	...	...	...	...	...	...
Canastota	3,244	2	.....	0	0	1	...	...	...	...	...	...	...
Norwich	7,115	5	.....	0	0	3	...	...	...	...	...	...	...
Oneonta	8,054	11	.....	2	0	4	1	...	...	...	...	...	...
Worcester	2,328	4	.....	0	0	3	...	...	...	...	...	...	...
Cooperstown	2,446	2	.....	0	0	1	...	...	...	...	...	...	...
Walton	5,000	7	.....	0	0	1	...	...	...	...	...	...	...
Sidney	4,319	4	.....	0	0	3	...	...	...	...	...	...	...
Liberty	5,483	8	.....	1	1	2	...	...	...	...	...	...	1
Rest of District	220,100	241	13.1	14	5	136	2	...	...	...	...	...	...
Totals for the District	414,200	470	13.6	48	17	217	7	...	...	...	...	1	3
Totals for November, 1905	414,800	495	14.3	39	23	171	6	...	...	1	1	1	4
WEST CENTRAL DISTRICT.‡													
AUBURN	31,422	32	12.2	5	0	9	...	...	...	...	...	...	1
ITHACA	14,615	16	13.1	2	1	6	1	...	...	...	...	...	1
Hector	3,888	3	.....	0	0	2	...	...	...	...	...	...	...
Waterloo	4,123	7	.....	0	1	2	...	...	...	...	...	...	2
Seneca Falls	6,733	11	.....	3	0	4	1	...	...	...	...	...	...
GENEVA	12,249	11	10.8	0	2	4	2	...	...	...	...	...	...
Canandaigua	7,332	11	.....	0	0	4	3	...	...	...	...	...	1
Manchester	4,809	8	.....	3	0	3	...	...	...	...	...	...	...

* Includes Chautauqua, Cattaraugus, Allegany, Steuben, Chemung, Tioga and Broome counties.
† Includes Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties.
‡ Includes Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties.

NOVEMBER, 1906 — (*Continued*).

...EASES.																						
Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
				6	6	1	10	5	5			3	2	1	1	1		2	3	1	4	
					1		1		1			2							1			
					2	1									1							
				2			1	1	1													
1	1			6	4	2	2	5	2	2		3	3						4	1	2	
				1					1					1								
					1		2	2	4				1	2				1	2		1	
						1		1					1								1	
				2		1	3	2	2			5		1						1	4	
				1				1		2											2	
				3	3		1	1	1	2		1		1	1						3	
					2	1						1										
			1		1			1		1	2	2	2	1					1	1		
				2	1		5	3				2		1					1		3	
					1		1	2					1									
2	2			17	6	18	52	40	13	19	3	24	19	9	5	1			11	19	18	3
3	3		1	40	28	25	78	64	30	26	5	43	29	17	8	2		3	23	23	38	3
				27	32	54	78	68	24	16	9	38	28	13	4					44	36	
				11	11	6	19	27	8	7	4	11	5	4			1	2	10	6	5	1
				2																		
					1	2	2	1					1		1						1	
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			1	13	9	19	36	43	13	12	9	12	18	9	2	5		2	3	15	17	1
	1		1	32	26	32	65	84	22	22	13	30	26	16	3	6	1	5	18	25	28	3
			1	49	23	54	63	94	31	13	10	39	30	5	2					33	33	
				5	1	4		3	2	2		7	1	1					4	1		
					1	3	3	1	1		1	1	2							1		
				1				1								1						
				1			1	1													2	
				1				3	1	2									2	1		
					2		2	2	1	1		1										
				2			3	1						1								
					1	1		1				1	1					1	1			[illegible]

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES.			EPIDEMIC DIS						
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
WEST CENTRAL DIST.—(*Con.*).													
Phelps	4,757	4	.....	1	0	2	...	...	...	...	...	...	...
Penn Yan	4,504	7	.....	0	0	5	...	...	...	...	...	...	...
Batavia	10,080	10	.....	3	0	5	...	...	...	...	...	...	...
Dansville	3,908	5	.....	0	0	4	...	...	...	...	...	...	...
Le Roy	3,400	3	.....	0	0	2	...	...	...	...	...	...	...
Warsaw	4,469	2	.....	0	0	0	...	...	...	...	...	...	...
Rest of District	199,400	254	15.2	29	11	137	3	...	...	3	...	2	2
Totals for the District	315,700	384	14.6	46	15	189	10	...	...	3	...	2	7
Totals for November, 1905	320,300	367	14.0	30	8	138	4	...	...	...	2	4	5
LAKE ONTARIO AND WESTERN DISTRICT.*													
BUFFALO	376,587	486	15.5	93	37	107	8	...	...	6	2	1	8
TONAWANDA	7,904	7	10.6	1	2	1	...	...	...	...	...	...	...
Amherst	4,500	3	.....	0	1	0	...	...	...	...	...	...	1
NORTH TONAWANDA	10,197	9	10.6	1	1	1	...	...	...	...	...	...	...
LOCKPORT	17,552	16	10.9	2	4	10	...	...	...	...	...	...	...
NIAGARA FALLS	26,560	40	18.1	6	4	6	7	...	...	...	1	...	...
Medina	5,114	6	.....	0	0	3	1	...	...	...	...	...	...
Albion	5,174	1	.....	0	0	1	...	...	...	...	...	...	...
Brockport	3,627	2	.....	0	0	1	1	...	...	...	...	...	...
ROCHESTER	181,666	196	12.9	28	13	65	...	...	...	2	2	...	12
Palmyra	4,042	2	.....	0	0	2	...	...	...	...	...	...	...
Newark	4,554	5	.....	0	0	4	...	...	...	...	...	...	...
Lyons	4,758	4	.....	2	0	1	...	...	...	...	...	...	...
Clyde	2,552	4	.....	0	1	2	...	...	...	...	...	...	1
OSWEGO	22,572	22	11.7	4	0	8	2	...	...	...	...	...	...
FULTON	8,847	9	12.2	1	1	5	...	...	...	...	...	...	...
Richland	3,611	8	.....	0	0	6	...	...	...	...	...	...	...
Rest of District	257,500	292	13.6	37	9	163	6	...	...	1	...	3	1
Totals for the District	947,875	1,112	14.1	175	69	386	25	...	...	9	5	4	23
Totals for November, 1905	933,000	1,158	15.0	160	55	265	27	1	...	3	...	8	32
Totals for the State	8,198,500	10,539	15.4	1,673	717	2,961	194	12	...	31	29	46	289
Average for past five years	....	9,769	15.5	1,443	1,546	1,807	161	12	6	42	61	39	269
Totals for November, 1905	8,016,700	10,333	15.6	1,479	684	1,966	141	6	...	49	37	48	203

* Includes Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

NOVEMBER, 1906 — (*Concluded*).

EASES.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
					1		1					1							1			
					1		2	2	1												1	
				1			2	1		1				1					3		1	
							1	1		1		1									1	
					1							2										
								1							1							
2	....	....	1	20	22	8	40	34	16	11	3	21	14	5	3	....	....	1	10	12	20	1
2	....	....	1	31	30	16	55	52	22	18	4	35	18	8	4	1	....	2	21	15	25	2
....	....	....	....	30	15	41	53	61	25	8	6	30	18	8	3	....	....	....	....	29	25	....
1	2	....	....	41	26	29	49	69	48	24	4	29	18	20	10	....	....	1	36	19	35	....
					1	2			1			1		1					1			
						1			1													
				1			3	1	1							1					2	
				2		1	1	3	1	1		2	2					1	1		1	
				2	1		5	4	1	5		3					1		2		7	1
				2			1						1								1	
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....	....	....	1	15	13	2	27	24	8	12	3	11	8	7	....	....	3	3	15	8	18	2
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1	1			2	1	1		3	2	3			1						4		1	
						1			1	1		3				1				1	1	
				1	2		3							1							1	
1	....	....	1	13	11	20	47	56	13	15	8	25	10	3	3	....	1	3	11	17	23	....
3	3	....	2	81	56	58	139	160	77	64	15	76	41	33	13	2	5	8	70	45	92	3
....	1	....	7	92	56	131	154	161	94	30	34	68	52	21	12	....	....	....	....	75	99	....
28	22	40	14	1,094	528	547	1,089	1,243	1,187	472	262	621	696	219	101	53	15	93	571	278	719	86
....	14	....	41	1,065	452	1,288	1,027	1,111	1,225	942	255	563	587	248	79	....	....	....	....	383	611	....
....	19	....	65	1,131	478	1,406	1,045	1,278	1,231	285	229	574	720	162	98	....	....	....	....	393	735	....

VITAL STATISTI

Cities are printed in SMALL CAPITALS, Villages in *Italic* and Town

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES.			EPIDEMIC					
				Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough
MARITIME DISTRICT.*												
City of New York:												
BOROUGH OF MANHATTAN	2,174,335	3,434	18.9	625	268	780	32	1	...	9	23	2
BOROUGH OF THE BRONX	290,097	527	21.8	59	40	108	6	...	...	6	1	
BOROUGH OF BROOKLYN	1,404,569	2,096	17.9	333	197	542	18	5	...	12	22	1
BOROUGH OF QUEENS	209,685	305	17.4	58	36	81	...	...	...	...	...	[illegible]
BOROUGH OF RICHMOND	74,173	115	18.6	11	11	46	...	...	...	...	1	[illegible]
Totals	4,152,860	6,477	18.7	1,086	552	1,557	56	6	...	27	47	4
Oyster Bay	20,545	16	...	0	0	5	...	...	...	...	...	...
Hempstead	34,746	53	...	16	5	13	...	1	...	...	...	...
North Hempstead	14,163	27	...	4	1	10	...	...	...	...	...	...
Southold	8,989	10	...	0	0	5	...	...	...	...	...	...
Sag Harbor	3,048	4	...	0	0	2	...	...	...	...	...	...
Huntington	10,236	16	...	0	0	12	...	...	...	...	...	...
Brookhaven	16,050	16	...	0	0	10	...	...	...	...	...	...
YONKERS	61,716	90	17.5	10	7	34	...	...	...	...	...	...
Greenburgh	18,635	23	...	2	0	12	...	...	...	...	...	...
MOUNT VERNON	25,006	36	17.3	10	4	10	...	...	...	...	2	...
Port Chester	11,198	13	...	2	0	4	...	1	...	...	...	...
Ossining	7,135	23	...	2	2	9	1	...	...	...	...	...
NEW ROCHELLE	20,480	17	10.0	4	1	4	...	...	...	...	...	...
Peekskill	13,200	24	...	4	1	6	...	...	...	...	...	...
White Plains	11,579	23	...	3	2	11	...	...	...	...	...	...
Mamaroneck	5,090	4	...	1	0	2	...	...	...	...	...	...
Rest of District	98,264	175	21.4	15	2	68	...	...	...	...	...	1
Totals for the District	4,523,940	7,047	18.7	1,159	557	1,774	57	8	...	27	49	4
Totals for December, 1905	4,359,000	6,435	17.3	1,068	600	768	59	3	...	42	27	1
HUDSON VALLEY DISTRICT.†												
ALBANY	100,000	157	15.7	10	6	57	3	...	...	...	...	1
COHOES	24,183	54	26.8	13	4	10	2	...	...	...	...	1
TROY	76,910	130	20.3	21	8	32	3	...	...	...	...	1
WATERVLIET	14,600	27	22.2	4	1	15	...	...	...	...	...	...
Green Island	4,878	7	...	3	0	1	...	...	...	...	...	...
Hoosick Falls	5,251	8	...	1	1	1	...	...	...	...	...	...
RENSSELAER	10,715	10	11.2	1	2	4	...	...	...	...	...	...
Coxsackie	4,317	9	...	1	0	6	...	...	...	...	...	...
Catskill	5,294	7	...	3	0	1	1	...	...	...	...	1
HUDSON	10,290	12	14.0	3	1	5	...	...	...	...	...	2
KINGSTON	25,556	36	16.9	2	2	13	...	...	...	...	...	...
Ellenville	2,872	3	...	0	0	0	...	...	...	...	...	...
Marbletown	3,000	1	...	0	0	1	...	...	...	...	...	...
Rosendale	4,670	4	...	0	1	2	...	...	...	...	...	...
Esopus	4,786	6	...	0	0	2	...	...	...	...	...	...
Saugerties	3,833	4	...	0	0	1	...	...	...	...	...	...
POUGHKEEPSIE	25,379	38	18.0	3	4	18	2	...	...	...	...	...
Fishkill	13,183	12	...	2	3	1	...	...	...	2	...	...
Wappingers Falls	3,588	4	...	1	0	2	...	...	...	...	...	...
NEWBURG	26,500	37	16.7	3	3	3	...	...	...	...	...	...
Port Jervis	9,700	16	...	1	0	6	...	...	...	...	...	...
MIDDLETOWN	14,516	25	20.7	1	0	13	...	...	...	...	...	...
Warwick	6,690	3	...	1	0	2	...	...	...	...	...	...
Goshen	5,023	11	...	1	0	9	...	...	...	...	...	...
Montgomery	6,652	4	...	0	0	2	...	...	...	...	...	...

* Includes Greater New York, Long Island [Nassau and Suffolk counties] and Westchester cour

† Includes Rockland, Putnam, Orange, Dutchess, Ulster, Greene, Columbia, Albany and Rens laer counties.

FOR DECEMBER, 1906.

Roman type; Populations estimated to date printed in full faced figures.

EASES.																						
Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
21	15	....	27	390	149	196	220	358	617	112	76	170	313	60	43	17	5	27	204	20	210	38
2	1	....	2	125	24	22	30	60	68	13	11	18	29	5	9	2	3	...	20	12	39	6
17	5	6	....	212	69	102	172	270	380	112	35	109	176	15	16	4	2	21	74	30	111	7
1	....	....	2	22	14	10	82	21	68	13	5	10	22	6	1	1	....	2	18	4	34	1
....	....	....	....	17	4	2	7	13	16	3	4	4	11	2	3	...	1	...	5	8	9	...
41	21	6	31	766	260	332	461	722	1,149	253	131	311	551	88	72	24	11	50	321	74	403	52
....	....	....	....	5	3	....	....	1	2	1	....	2	....	1	....	...	....	...	....	....	1	...
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42	22	6	33	821	293	348	584	812	1,214	282	139	350	584	100	75	26	11	54	352	89	448	53
....	16	....	71	781	277	904	516	684	1,096	167	142	294	547	38	87	...	....	...	....	105	382	...
....	....	....	....	19	8	6	15	19	24	8	....	7	14	1	....	...	....	...	1	8	9	5
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VITAL STATISTICS FO

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	Ages. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Epidemic D[iseases] Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.
HUDSON VALLEY DIST.—(*Con.*).												
Haverstraw	10,482	11	.....	1	1	4	...	1	...	1	...	...
Nyack	4,441	8	.....	1	0	4	...	...	...	...	...	...
Ramapo	10,142	16	.....	3	1	5	...	...	...	...	...	...
Rest of District	268,000	376	16.8	39	16	185	4	2	...	2	...	...
Totals for the District	705,500	1,036	17.5	119	54	405	15	3	...	5	...	6
Totals for December, 1905	696,000	966	16.2	93	51	225	19	1	...	...	2	5
ADIRONDACK AND NORTHERN DISTRICT.*												
WATERTOWN	25,447	36	17.0	4	2	13	2	...	...	...	1	...
Ellisburgh	3,740	8	.....	1	0	7	...	...	...	...	...	...
Carthage	3,404	4	.....	1	0	3	...	...	...	...	...	...
Clayton	4,100	4	.....	0	0	4	...	...	...	...	...	...
OGDENSBURGH	13,179	18	16.4	3	2	5	1	...	...	...	...	...
Gouverneur	6,582	5	.....	1	0	3	...	...	...	...	...	...
Potsdam	4,162	3	.....	0	1	2	...	...	...	...	...	...
Canton	6,800	8	.....	1	0	6	...	...	...	...	...	...
Malone	6,478	10	.....	0	0	8	...	...	...	...	...	...
PLATTSBURGH	10,184	11	13.0	2	0	3	...	...	...	...	...	...
Glens Falls	14,650	17	.....	5	1	4	1	...	...	...	...	...
Whitehall	4,148	9	.....	1	1	8	...	...	...	...	...	...
Fort Edward	5,300	13	.....	0	0	6	1	...	...	...	...	...
Sandy Hill	5,321	11	.....	1	1	6	...	...	...	...	1	...
Granville	6,487	9	.....	2	0	4	...	...	...	...	...	...
Greenwich	4,338	8	.....	1	0	4	...	...	...	...	...	...
Lowville	3,921	5	.....	0	0	3	...	...	...	...	...	...
Rest of District	279,875	314	13.5	40	11	140	3	2	...	...	1	...
Totals for the District	408,116	493	14.5	63	19	224	8	2	...	...	3	...
Totals for December, 1905	395,000	474	13.6	56	16	143	13	...	...	4	1	2
MOHAWK VALLEY DISTRICT.†												
SCHENECTADY	71,205	71	12.0	20	6	16	1	...	...	...	...	...
Cobleskill	3,731	4	.....	0	0	3	...	...	...	...	...	...
AMSTERDAM	23,943	35	17.5	6	1	15	1	...	...	...	2	...
Fort Plain	2,600	1	.....	1	0	0	...	...	...	...	...	...
JOHNSTOWN	9,845	5	6.1	0	1	3	1	...	...	...	1	...
GLOVERSVILLE	18,672	28	18.0	3	0	16	...	...	...	...	...	...
LITTLE FALLS	11,122	22	23.7	5	1	10	2	...	...	...	...	1
Herkimer	6,600	10	.....	0	0	7	...	...	...	...	...	...
Ilion	5,924	4	.....	0	0	3	...	...	...	...	...	...
UTICA	62,934	87	16.6	12	8	25	...	...	...	2	...	1
Whitestown	6,895	9	.....	1	2	1	...	...	...	...	...	...
ROME	16,562	31	22.5	3	1	12	1	...	...	...	...	1
Boonville	3,167	7	.....	1	0	5	...	...	...	...	...	...
Camden	3,750	4	.....	0	0	3	...	...	...	...	...	...
Waterford	6,000	9	.....	0	0	8	...	...	...	...	...	...
Mechanicville	5,877	8	.....	2	0	3	...	...	...	...	...	...
Ballston Spa	4,131	10	.....	3	0	5	...	...	...	...	...	...
Saratoga Springs	13,000	17	.....	1	1	10	...	...	...	...	...	...
Rest of District	181,600	221	14.6	17	5	129	2	...	...	...	...	[illegible]
Totals for the District	444,740	583	15.7	75	26	274	8	...	...	2	3	[illegible]
Totals for December, 1905	420,000	612	16.3	66	25	176	12	1	...	...	12	[illegible]

* Includes Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jeffe[rson] and Lewis counties.

† Includes Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida coun[ties].

DECEMBER, 1906 — (*Continued*).

Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
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2	...	3	87	35	40	132	140	105	70	5	73	65	27	7	5	...	5	42	38	75	17
1	...	3	106	50	83	116	147	110	40	24	55	70	16	5	...	...	...	...	43	52	...
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3	...	1	47	14	29	74	82	39	26	3	32	20	12	5	2	...	2	30	25	18	1
...	...	2	44	35	68	61	57	40	12	10	29	24	5	4	...	...	...	...	37	19	...
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2	...	...	40	25	27	74	98	58	34	7	32	34	12	8	4	...	1	32	25	29	4
2	...	4	41	33	69	68	99	61	35	2	34	35	8	4	...	...	...	...	51	32	...

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	AGES. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	EPIDEMIC DIS Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
HUDSON VALLEY DIST.—(*Con.*).													
Haverstraw	10,482	11	....	1	1	4	...	1	...	1	...	...	...
Nyack	4,441	8	....	1	0	4	...	...	...	...	...	...	...
Ramapo	10,142	16	....	3	1	5	...	...	...	...	...	...	...
Rest of District	268,000	376	16.8	39	16	185	4	2	...	2	...	...	13
Totals for the District	705,500	1,036	17.5	119	54	405	15	3	...	5	...	6	31
Totals for December, 1905	696,000	966	16.2	93	51	225	19	1	...	...	2	5	18
ADIRONDACK AND NORTHERN DISTRICT.*													
WATERTOWN	25,447	36	17.0	4	2	13	2	...	...	...	1	...	2
Ellisburgh	3,740	8	....	1	0	7	...	...	...	...	...	...	...
Carthage	3,404	4	....	1	0	3	...	...	...	...	...	...	...
Clayton	4,100	4	....	0	0	4	...	...	...	...	...	...	...
OGDENSBURGH	13,179	18	16.4	3	2	5	1	...	...	...	...	...	1
Gouverneur	6,582	5	....	1	0	3	...	...	...	...	...	...	...
Potsdam	4,162	3	....	0	1	2	...	...	...	...	...	...	...
Canton	6,800	8	....	1	0	6	...	...	...	...	...	...	...
Malone	6,478	10	....	0	0	8	...	...	...	...	...	...	...
PLATTSBURGH	10,184	11	13.0	2	0	3	...	...	...	...	...	...	...
Glens Falls	14,650	17	....	5	1	4	1	...	...	...	...	...	...
Whitehall	4,148	9	....	1	1	3	...	...	...	...	...	...	1
Fort Edward	5,300	13	....	0	0	6	1	...	...	...	...	...	...
Sandy Hill	5,321	11	....	1	1	6	...	...	...	...	1	...	...
Granville	6,487	9	....	2	0	4	...	...	...	...	...	...	...
Greenwich	4,338	8	....	1	0	4	...	...	...	...	...	...	...
Lowville	3,921	5	....	0	0	3	...	...	...	...	...	...	...
Rest of District	279,875	314	13.5	40	11	140	3	2	...	...	1	...	4
Totals for the District	408,116	493	14.5	63	19	224	8	2	...	...	3	...	8
Totals for December, 1905	395,000	474	13.6	56	16	143	13	...	...	4	1	2	7
MOHAWK VALLEY DISTRICT.†													
SCHENECTADY	71,205	71	12.0	20	6	16	1	...	...	...	...	...	2
Cobleskill	3,731	4	....	0	0	3	...	...	...	...	...	...	...
AMSTERDAM	23,943	35	17.5	6	1	15	1	...	...	...	2	...	2
Fort Plain	2,600	1	....	1	0	0	...	...	...	...	...	...	...
JOHNSTOWN	9,845	5	6.1	0	1	3	1	...	...	...	1	...	...
GLOVERSVILLE	18,672	28	18.0	3	0	16	...	...	...	...	...	...	...
LITTLE FALLS	11,122	22	23.7	5	1	10	2	...	...	...	...	1	1
Herkimer	6,600	10	....	0	0	7	...	...	...	...	...	...	...
Ilion	5,924	4	....	0	0	3	...	...	...	...	...	...	...
UTICA	62,934	87	16.6	12	8	25	...	...	...	2	...	1	3
Whitestown	6,895	9	....	1	2	1	...	...	...	...	...	...	1
ROME	16,562	31	22.5	3	1	12	1	...	...	...	...	1	2
Boonville	3,167	7	....	1	0	5	...	...	...	...	...	...	...
Camden	3,750	4	....	0	0	3	...	...	...	...	...	...	...
Waterford	6,000	9	....	0	0	8	...	...	...	...	...	...	...
Mechanicville	5,877	8	....	2	0	3	...	...	...	...	...	...	...
Ballston Spa	4,131	10	....	3	0	5	...	...	...	...	...	...	...
Saratoga Springs	13,000	17	....	1	1	10	...	...	...	...	...	...	...
Rest of District	181,600	221	14.6	17	5	129	2	...	...	...	...	2	4
Totals for the District	444,740	583	15.7	75	26	274	8	...	...	2	3	5	15
Totals for December, 1905	420,000	612	16.3	66	25	176	12	1	...	...	12	2	7

* Includes Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis counties.

† Includes Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties.

DECEMBER, 1906 — (*Continued*).

EASES.

Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
....	....	....	....	1	....	....	3	2	....	1	....	....	1	....	....	....	....	....	....	....	1	...
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....	....	....	....	3	....	....	3	1	1	1	1	1	2	....	....	....	....	....	1	....	2	...
2	1	....	2	28	14	15	49	62	29	24	1	26	23	11	3	2	....	3	10	17	30	3
3	2	....	3	87	35	40	182	140	105	70	5	73	65	27	7	5	....	5	42	38	75	17
....	1	....	3	106	50	83	116	147	110	40	24	55	70	16	5	....	....	....	....	43	52	...
....	1	....	....	1	1	1	4	6	7	1	....	2	2	2	....	....	....	1	1	....	1	...
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5	1	....	1	35	10	19	45	51	22	13	3	23	12	6	4	1	....	....	21	17	14	1
7	3	....	1	47	14	29	74	82	39	26	3	32	20	12	5	2	....	2	30	25	18	1
....	....	....	2	44	35	68	61	57	40	12	10	29	24	5	4	....	....	....	....	37	19	...
....	1	....	....	7	1	3	7	4	11	6	1	2	4	....	2	....	....	....	10	1	8	...
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....	1	....	....	11	10	12	31	43	21	14	....	10	14	6	3	3	....	....	9	14	9	2
1	2	....	....	40	25	27	74	98	58	34	7	32	34	12	8	4	....	1	32	25	29	4
....	2	....	4	41	33	69	68	99	61	35	2	34	35	8	4	....	....	....	....	51	32	...

VITAL STATISTICS FOR

SANITARY DISTRICTS.	Population by State census of 1905.	Total deaths.	Annual death rate per 1,000 population.	Ages. Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Epidemic Dis[eases] Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.
Phelps	4,757	7	....	1	0	5	...	...	...	...	...	...	2
Penn Yan	4,504	3	....	1	0	2	...	...	...	...	...	...	...
Batavia	10,080	19	....	2	2	8	3	...	...	...	...	...	2
Dansville	3,908	4	....	0	1	1	...	...	...	...	...	...	...
Le Roy	3,400	2	....	0	0	2	...	...	...	...	...	...	...
Warsaw	4,469	2	....	0	0	1	...	...	...	...	...	...	...
Rest of District	199,400	272	16.4	24	1	173	3	...	...	...	...	...	...
Totals for the District	315,700	421	16.0	38	6	247	7	...	...	...	...	1	5
Totals for December, 1905	320,500	420	16.0	26	16	165	8	...	...	...	1	3	1
LAKE ONTARIO AND WESTERN DISTRICT.*													
BUFFALO	376,587	564	18.0	121	40	134	6	1	...	12	3	2	5
TONAWANDA	7,904	11	16.7	2	0	6	...	...	...	...	...	...	...
Amherst	4,500	5	....	0	0	2	...	...	...	...	...	...	...
NORTH TONAWANDA	10,197	10	11.8	4	0	3	...	...	...	1	...	...	...
LOCKPORT	17,552	24	16.4	3	1	8	...	...	...	...	...	...	2
NIAGARA FALLS	26,560	38	17.2	10	2	4	3	...	...	...	...	...	2
Medina	5,114	6	....	0	0	2	...	...	...	...	...	...	...
Albion	5,174	10	....	1	0	3	...	...	...	...	...	...	1
Brockport	3,627	11	....	1	0	7	...	...	...	...	...	...	1
ROCHESTER	181,666	263	17.4	23	19	98	3	...	...	...	1	...	9
Palmyra	4,042	7	....	3	0	4	...	...	...	...	...	...	...
Newark	4,554	6	....	2	0	2	...	...	...	...	...	...	...
Lyons	4,758	11	....	1	0	5	...	...	...	...	...	...	...
Clyde	2,552	6	....	1	1	3	...	...	...	...	...	...	1
OSWEGO	22,572	44	23.4	8	3	15	2	...	...	...	...	1	...
FULTON	8,847	10	13.6	1	1	3	...	...	...	...	...	...	...
Richland	3,611	2	....	0	0	1	...	...	...	...	...	...	...
Rest of District	257,500	300	14.0	30	15	149	5	1	...	...	2	1	6
Totals for the District	947,875	1,328	16.8	211	82	449	19	2	...	13	6	4	27
Totals for December, 1905	915,200	1,162	15.0	158	68	278	39	...	...	7	9	2	20
Totals for the State	8,198,500	12,075	17.7	1,781	782	3,973	136	15	...	48	63	63	269
Average past five years	....	10,878	16.8	1,611	881	2,063	157	11	12	67	83	44	303
Totals for December, 1905	7,735,000	11,135	16.5	1,576	821	2,097	165	5	...	55	56	44	245

* Includes Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

DECEMBER, 1906 — (*Concluded*).

EASES.																						
Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
							2	1												2		
							1	1											1			
						4	4					2	2						2			
				1			2						1									
							1			1												
									1			1										
3				19	22	11	54	42	17	12	2	21	9	4	1	6			9	18	19	
3				28	27	20	77	58	24	17	3	33	17	8	3	7			16	30	37	
			1	30	19	35	69	67	41	11	6	34	25	5	3					37	33	
	3		5	36	30	30	62	61	77	34	13	24	31	14	9				37	24	45	
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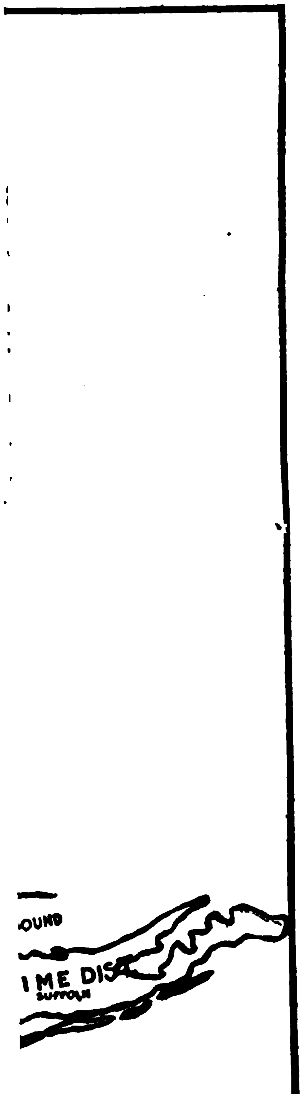
						1				1		1									2	
					2		3				2			1							1	
				1			5	3	2	1		1	4			1		1		1	1	1
				4	1	4		3	4	2		4	2			1			6		2	
				1				1	2				2									
								3	1	2		1							1		1	
							3	3		1									1	1	1	
			2	28	13	14	38	39	10	20	2	24	17	6	3	1			10	6	14	3
								1		1		2							2	1		
						1				3										2		
					1		3	2		1									1		3	
									2			1	2									
				3	2	3	4	4		1		9	2	1					6	2	4	
			1			2	2	3	1										1			
								1													1	
3				17	15	11	47	44	18	18	1	32	22	9	1	3			12	10	22	
3	3		8	90	65	66	168	172	118	85	18	99	82	31	13	6		1	78	48	99	4
	3		3	77	69	134	150	157	75	63	29	71	67	17	15					74	81	
70	34	6	46	1,179	504	576	1,220	1,582	1,644	585	182	719	872	236	120	59	11	65	601	305	782	83
	36		61	1,104	476	1,391	1,172	1,233	1,326	536	221	596	700	196	94					435	575	
	28		95	1,155	542	1,391	1,136	1,352	1,528	364	226	591	827	112	127					438	653	

MORTALITY OF THE STATE OF NEW YORK FOR THE TEN YEARS, 1897–1906, AS PUBLISHED IN THE MONTHLY BULLETIN.

				Ages.			Epidemic Diseases.										
	Population.	Total deaths.	Rate per 1,000 of population.	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 60 years and over.	Typhoid fever.	Malarial diseases.	Smallpox.	Measles.	Scarlatina.	Whooping cough.	Diphtheria and croup.	Influenza.	Erysipelas.	Epidemic cerebro-spinal meningitis.	Sporadic cerebro-spinal meningitis.
1906	8,198,500	140,343	17.1	27,114	12,176	§32,734	1,568	139	7	1,369	690	821	2,691	182	452	257	921
1905	8,067,308	137,059	17.4	25,827	12,218	23,783	1,554	106	9	988	726	847	2,296	....	415	....	†2,566
1904	7,746,000	141,304	18.2	24,909	14,177	4,742	1,652	149	13	1,170	1,194	426	3,041	....	430	....	1,708
1903	7,614,281	126,536	16.7	......	*32,768	22,050	1,665	137	41	721	1,057	811	3,035	....	351	....	454
1902	7,467,050	123,494	17.0	......	31,215	20,709	1,318	189	442	929	1,215	923	2,859	....	314	....	456
1901	7,268,000	129,257	17.8	......	35,775	22,233	1,741	283	445	859	1,430	721	3,026	....	363	....	492
1900	7,268,000	128,468	17.8	......	39,204	....	1,948	309	14	1,333	689	020	3,306	....	466	....	531
1899	7,110,000	121,821	17.3	......	35,386	....	1,604	249	21	756	730	986	2,786	....	353	....	702
1898	6,513,343	120,972	18.1	......	37,113	....	1,810	404	1	838	837	155	2,612	....	237	....	695
1897	6,513,343	117,078	18.4	......	35,771	....	1,351	380	27	873	841	825	4,115	....	303	....	538
Average	7,376,582	128,633	17.4	......	*36,450	§24,375	1,620	224	102	984	941	843	2,977	....	368	....	†906

* All deaths under 5 years. § Previous to May, 1906, this column tabulated deaths at 70 years and over. † Includes deaths from epidemic cerebro-spinal meningitis.



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MORTALITY OF THE STATE OF NEW YORK FOR THE TEN YEARS, 1897-1906 — (*Continued*).

	Pulmonary tuberculosis.	Cancer.	Unclassified general diseases.	Diseases of the nervous system.	Diseases of the circulatory system.	Pneumonia.	Other diseases of the respiratory system.	Diarrhea and enteritis (under 2 years).	Other diseases of the digestive system.	Bright's disease.	Other diseases of the genito-urinary system.	The puerperal state.	Diseases of the skin.	Diseases of the organs of locomotion.	Malformations.	Early infancy (under 3 months).	Old age (60 years and over).	External causes.	Ill-defined diseases.
1906	14,027	6,168	12,094	13,521	15,395	15,333	4,663	8,578	8,741	8,984	2,360	1,326	379	105	497	4,606	4,332	8,874	1,263
1905	14,061	6,056	19,025	13,569	14,547	14,157	3,675	8,955	8,158	8,869	1,828	1,377	....	....	....	....	4,923	8,352	....
1904	14,159	5,697	19,858	14,192	14,309	13,531	7,601	8,329	7,866	9,061	1,755	1,272	....	....	....	....	5,120	8,822	....
1903	13,194	5,456	17,464	12,966	13,561	......	‡17,339	7,480	7,282	6,898	3,100	1,110	....	....	....	....	4,765	7,646	....
1902	12,582	4,990	15,833	12,964	12,889	......	16,986	8,315	7,235	.....	¶9,604	1,034	....	....	....	....	4,949	7,058	....
1901	13,766	5,033	17,388	13,366	11,949	......	17,589	9,337	7,478	.....	9,558	1,068	....	....	....	....	5,439	7,926	....
1900	13,590	4,871	21,536	12,993	10,676	......	19,232	7,959	10,644	.....	9,501	1,136	....	....	....	....	5,402	6,714	....
1899	13,412	4,533	15,324	13,177	10,606	......	17,938	6,480	10,163	.....	9,064	877	....	....	....	....	6,068	6,093	....
1898	12,979	4,385	14,641	13,312	10,511	......	16,350	8,499	10,101	.....	8,641	920	....	....	....	....	5,524	6,520	....
1897	12,641	4,131	14,950	12,124	10,905	......	16,277	7,267	8,963	.....	7,866	1,013	....	....	....	....	5,516	6,172	....
Average	13,441	5,132	16,811	13,219	12,379	......	‡18,067	8,121	8,663	.....	¶9,708	1,113	....	....	....	....	5,204	7,417	....

‡ Includes deaths from all respiratory diseases. ¶ Includes deaths from Bright's disease.

MORTALITY OF THE MONTHS

MONTHS.	Total number of deaths.	Deaths under five years.	Percentage of deaths under five years to total deaths.	Epidemic deaths per 1,000 deaths from all causes.	Cerebrospinal fever.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
January:												
1892	13,460	3,266	24.1	107	58	116	38	2	294	80	51	48
1893	10,490	3,056	29.1	137	44	120	34	15	237	86	52	94
1894	10,948	3,088	28.2	124	53	105	30	34	146	122	45	55
1895	10,980	3,123	28.6	100	51	108	30	3	103	34	38	78
1896	10,176	3,064	30.0	129	49	158	22	1	118	199	31	73
1897	9,587	2,663	27.7	104	42	108	26	......	76	70	28	58
1898	9,632	2,416	25.0	95	34	122	26	......	123	112	21	44
1899	12,421	2,590	21.0	65	52	111	12	1	71	51	43	77
1900	10,552	2,788	26.5	94	29	144	17	......	75	154	43	79
1901	12,524	2,557	20.5	84	38	192	14	10	108	59	33	56
1902	10,968	2,933	26.8	103	48	146	16	39	141	132	42	58
1903	11,146	2,625	23.5	85	39	152	8	20	98	40	27	73
1904	12,288	2,889	23.5	90	43	124	9	3	161	95	36	22
1905	11,896	2,888	24.5	80	149	104	4	......	103	59	41	45
1906	11,838	2,893	24.4	84	94	120	8	......	75	127	53	58
February:												
1892	10,755	3,139	29.2	123	53	98	33	7	290	89	79	41
1893	9,353	2,810	29.6	136	46	101	29	23	198	80	58	121
1894	9,417	2,943	30.2	125	42	86	14	52	139	125	41	60
1895	10,771	3,049	28.3	85	40	99	9	5	98	44	38	87
1896	9,825	2,892	29.5	116	31	121	28	......	110	192	45	52
1897	9,826	2,743	28.0	97	52	98	23	......	84	89	26	75
1898	9,213	2,543	27.5	91	53	104	22	......	93	84	32	47
1899	10,763	2,506	23.5	70	45	116	20	1	87	37	36	76
1900	10,796	3,142	29.1	107	49	122	18	......	119	206	56	91
1901	11,022	2,482	22.6	86	41	114	11	35	126	74	54	54
1902	10,670	2,890	27.0	102	47	63	14	51	162	166	34	72
1903	10,826	2,604	23.1	82	29	151	8	3	114	55	37	74
1904	12,749	2,956	23.2	82	48	145	9	1	149	94	54	37
1905	11,730	2,861	24.3	85	218	88	5	4	90	78	58	55
1906	11,351	3,080	27.1	89	106	106	2	1	58	177	53	54
March:												
1892	10,978	2,342	21.3	124	77	96	37	3	285	114	70	48
1893	12,000	3,418	28.5	120	89	115	37	29	221	76	41	166
1894	10,196	3,215	31.5	137	52	131	26	47	174	164	46	95
1895	11,379	3,340	29.4	98	53	99	23	......	131	99	51	83
1896	11,080	3,255	29.6	103	54	103	20	1	76	251	47	77
1897	11,574	3,381	29.2	92	55	83	26	2	99	113	45	121
1898	10,300	2,860	28.0	96	73	119	23	......	108	144	24	80
1899	11,065	2,807	25.2	75	82	121	12	1	98	61	40	73
1900	13,033	3,574	27.4	93	50	120	23	......	94	202	86	129
1901	11,913	3,070	25.8	94	61	111	6	39	200	100	50	57
1902	10,935	2,936	27.0	98	44	112	16	51	134	188	33	69
1903	11,651	2,891	25.7	62	42	151	10	2	100	70	48	109
1904	14,303	3,239	22.7	80	105	163	10	1	152	168	73	50
1905	13,135	3,189	24.4	107	490	97	5	1	106	130	64	66
1906	12,854	3,289	25.5	94	153	84	7	......	75	243	48	68
April:												
1892	10,590	3,245	30.7	128	76	77	40	11	248	161	63	60
1893	11,865	3,339	28.1	111	104	111	34	23	199	73	55	133
1894	9,945	3,147	31.6	135	55	94	33	54	184	148	49	104
1895	10,545	3,506	33.3	115	78	115	32	......	118	133	62	107
1896	10,480	3,246	31.0	111	50	87	33	......	81	234	62	88
1897	10,325	2,813	27.3	95	55	79	27	7	81	99	44	90
1898	10,000	2,763	28.0	93	82	80	28	......	84	126	29	118
1899	10,383	2,627	25.4	77	90	101	20	2	78	68	40	65
1900	12,486	3,376	27.1	86	61	96	23	1	92	191	94	117
1901	10,035	2,892	26.2	107	59	120	16	42	219	109	62	78
1902	10,772	2,444	22.5	100	42	103	12	61	142	122	44	85
1903	10,957	2,685	24.5	84	49	105	10	6	131	66	46	86
1904	13,700	3,450	25.2	105	254	104	7	......	173	225	54	49
1905	12,329	3,239	26.0	117	531	99	10	1	74	153	52	92
1906	12,360	3,298	26.6	90	176	79	7	1	93	248	52	74

FOR FIFTEEN YEARS.

Croup and diphtheria.	Diarrheal diseases.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrheal).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
659	94	3,801	1,286	125	686	541	953	1,339	295	362	1,183	1,149
613	141	2,293	1,099	136	568	607	866	1,128	260	339	515	1,243
680	87	2,479	1,140	103	618	664	812	1,164	258	361	707	1,285
547	108	2,578	1,244	81	617	622	916	1,037	290	403	506	1,586
530	127	2,015	1,152	91	614	688	934	959	302	344	464	1,305
476	112	1,742	1,051	83	592	658	964	1,005	322	437	503	1,234
323	113	1,765	1,051	91	642	739	1,013	1,032	346	400	467	1,168
255	127	2,965	1,304	76	735	818	1,116	1,386	351	400	917	1,553
352	95	2,100	1,140	121	686	838	968	1,138	382	461	460	1,270
345	196	2,770	1,326	98	629	877	1,114	1,223	440	544	648	1,804
320	188	2,274	1,038	99	645	853	1,234	1,103	384	500	448	1,260
288	211	1,991	1,205	90	547	976	1,256	1,159	467	568	490	1,441
318	193	2,607	1,187	106	644	991	1,334	1,319	459	540	463	1,634
260	202	2,256	1,169	107	610	961	1,324	1,253	499	572	474	1,704
280	188	2,291	1,183	122	643	935	1,283	1,244	493	584	465	1,592
538	99	2,315	1,196	113	620	564	813	1,218	232	340	770	1,247
480	141	1,910	954	102	602	554	779	1,102	218	279	496	1,080
527	89	1,940	1,063	87	578	550	728	1,112	227	283	499	1,175
391	107	2,526	1,161	93	600	670	917	1,035	281	351	598	1,621
444	114	2,012	1,084	100	577	690	879	992	303	398	502	1,151
370	134	1,996	1,117	72	614	628	956	1,071	251	403	490	1,176
275	119	1,738	1,031	75	673	754	763	1,123	300	337	483	1,098
236	101	2,329	1,204	64	651	765	1,045	1,200	320	412	710	1,308
352	137	2,402	1,131	107	543	873	866	1,109	396	471	463	1,285
240	200	2,292	1,130	114	614	832	1,095	1,135	371	403	603	1,486
264	180	2,241	1,100	97	558	823	1,189	1,161	375	457	412	1,174
240	181	2,071	1,160	89	566	829	1,174	1,124	422	517	459	1,523
305	207	2,823	1,179	143	606	1,014	1,350	1,239	442	570	542	1,792
241	159	2,468	1,140	135	622	899	1,289	1,236	468	538	476	1,663
300	158	2,132	1,198	108	606	902	1,228	1,128	487	548	440	1,559
531	108	2,390	1,272	137	638	583	803	1,305	276	323	690	1,192
517	163	2,951	1,286	131	699	695	885	1,330	303	334	589	1,343
546	124	1,814	1,190	110	638	633	760	1,196	262	346	476	1,366
445	137	2,395	1,274	104	691	721	971	1,160	312	417	714	1,499
370	142	2,310	1,490	121	695	744	1,031	1,180	316	414	586	1,052
377	146	2,485	1,190	117	672	737	1,136	1,208	375	441	615	1,531
281	123	1,872	1,166	89	718	810	901	1,251	382	430	511	1,186
220	126	2,145	1,284	81	726	838	1,052	1,290	418	419	588	1,390
342	167	3,137	1,363	160	689	982	1,132	1,301	443	437	591	1,585
277	215	2,522	1,293	122	644	884	1,116	1,324	409	409	532	1,542
247	227	1,951	1,235	120	606	911	1,167	1,176	406	487	442	1,363
251	222	2,107	1,260	117	644	915	1,307	1,157	478	537	534	1,590
252	182	3,083	1,432	144	757	1,040	1,453	1,449	492	619	660	2,018
208	230	2,252	1,382	145	698	989	1,418	1,349	542	621	535	1,807
314	214	2,490	1,387	141	699	992	1,398	1,233	494	636	496	1,682
491	131	2,161	1,252	126	665	576	822	1,291	240	400	466	1,233
444	143	2,943	1,329	124	678	637	865	1,413	304	402	572	1,279
511	117	1,718	1,091	85	688	604	741	1,102	298	449	501	1,319
424	151	2,135	1,220	83	666	653	917	1,017	282	433	494	1,425
345	187	2,124	1,189	98	635	641	919	1,080	320	480	471	1,356
360	137	1,893	1,158	105	646	742	979	1,167	325	455	517	1,359
252	137	1,869	1,100	91	671	782	884	1,218	333	435	481	1,200
197	138	1,895	1,187	93	760	820	997	1,206	346	430	532	1,318
277	117	2,962	1,302	125	852	860	1,080	1,270	410	469	578	1,509
273	200	1,899	1,296	101	613	867	1,058	1,268	423	481	447	1,404
268	231	1,716	1,154	108	644	872	1,188	1,241	439	515	414	1,371
247	224	1,808	1,224	112	596	851	1,279	1,178	453	606	434	1,440
330	241	2,891	1,399	140	663	1,016	1,400	1,290	432	639	493	1,890
220	215	2,023	1,340	144	621	959	1,349	1,200	527	622	417	1,680
263	226	2,305	1,349	113	618	952	1,380	1,186	527	647	446	1,618

MORTALITY OF THE MONTHS

MONTHS.	Total number of deaths.	Deaths under five years.	Percentage of deaths under five years to total deaths.	Epidemic deaths per 1,000 deaths from all causes.	Cerebrospinal fever.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
May:												
1892	10,223	3,289	32.3	139	69	71	50	13	245	254	56	69
1893	10,718	3,080	28.7	128	159	93	40	21	193	92	43	127
1894	9,286	2,862	30.8	139	53	85	29	37	140	97	36	97
1895	9,452	2,888	30.5	116	46	92	38	1	83	183	36	77
1896	9,541	2,842	30.0	119	51	59	38	1	78	172	40	100
1897	9,266	2,469	27.0	103	51	65	44	7	98	119	35	62
1898	9,748	2,690	27.0	93	81	86	27	......	113	109	30	112
1899	9,556	2,366	25.0	78	71	93	14	5	76	85	45	37
1900	10,938	3,160	29.0	93	51	102	28	1	71	161	52	111
1901	10,327	2,620	25.4	112	43	96	15	67	226	95	44	69
1902	10,616	2,778	26.2	105	46	99	20	52	175	104	32	83
1903	10,770	2,523	23.5	100	58	99	25	3	127	108	46	85
1904	11,243	2,706	22.0	125	409	108	19	2	143	193	52	51
1905	11,135	2,833	25.0	118	439	87	11	2	89	152	62	72
1906	12,072	3,115	25.8	102	186	69	9	2	135	205	65	58
June:												
1892	9,075	3,437	37.7	188	57	75	62	10	183	255	37	50
1893	8,728	2,885	33.0	162	96	83	42	10	154	99	24	77
1894	9,805	3,588	36.6	182	32	72	43	24	121	90	15	79
1895	8,736	3,114	35.6	175	40	81	35	......	71	217	28	95
1896	9,342	3,466	37.0	183	44	66	73	......	50	140	22	85
1897	9,028	2,865	31.5	140	51	66	31	7	82	86	31	64
1898	8,637	2,558	30.0	122	109	70	22	......	82	99	17	111
1899	9,433	3,104	33.0	145	62	80	22	7	71	102	31	73
1900	9,444	3,101	33.0	120	39	65	26	1	44	120	40	71
1901	9,500	2,500	26.3	133	42	83	27	74	165	95	27	54
1902	9,449	2,790	29.5	150	36	99	16	70	111	100	28	86
1903	9,285	2,453	26.5	135	36	74	11	2	102	104	30	71
1904	10,997	2,897	26.3	128	242	78	14	2	90	130	24	33
1905	10,000	2,841	29.0	142	210	82	9	......	58	143	42	69
1906	9,937	2,776	28.0	113	100	71	13	3	65	128	40	69
July:												
1892	13,555	6,855	52.1	340	59	131	61	8	75	150	20	136
1893	12,332	6,231	50.5	324	86	87	45	16	69	75	13	92
1894	12,516	6,260	50.0	335	50	93	44	19	76	55	14	121
1895	11,681	5,841	50.0	326	49	108	26	......	32	130	20	143
1896	12,659	6,192	49.0	305	64	103	50	......	55	85	12	117
1897	11,235	5,089	45.5	272	54	87	36	4	69	76	16	66
1898	11,441	4,945	43.0	255	68	89	24	......	59	52	13	176
1899	11,291	4,819	42.6	239	56	94	34	1	45	82	21	101
1900	11,641	4,728	40.6	235	53	101	17	1	43	92	22	113
1901	12,248	4,344	35.5	236	51	99	24	89	105	78	17	71
1902	10,938	4,132	38.5	250	54	107	21	34	76	57	23	115
1903	11,134	3,872	34.8	223	31	126	10	......	89	88	14	72
1904	12,061	6,367	53.0	260	140	124	10	1	52	71	21	32
1905	12,810	5,084	31.0	256	133	126	18	......	32	88	14	104
1906	11,932	4,341	36.3	202	83	97	17	......	34	86	23	93
August:												
1892	10,903	4,933	45.2	292	54	182	56	18	61	51	19	138
1893	11,087	4,954	45.0	298	55	157	62	11	63	44	14	129
1894	10,390	4,664	44.8	283	44	183	41	6	48	19	17	129
1895	11,050	4,962	45.0	282	46	156	39	......	26	76	17	156
1896	12,475	4,789	38.4	246	43	171	48	......	19	59	20	132
1897	10,084	4,021	40.0	240	38	124	41	......	19	40	23	84
1898	11,302	4,811	42.5	255	40	181	49	......	26	16	16	168
1899	10,003	3,696	37.0	216	64	157	23	......	26	49	15	120
1900	11,047	4,223	38.3	237	47	174	37	2	22	49	11	86
1901	10,999	4,339	40.0	285	43	168	36	40	49	40	9	80
1902	10,632	4,024	38.0	250	40	165	21	10	39	28	14	110
1903	10,435	3,654	35.0	220	46	141	7	......	50	49	20	82
1904	11,116	4,113	37.0	230	119	143	16	2	27	34	18	40
1905	11,754	5,002	38.0	235	95	189	15	1	18	43	18	126
1906	12,456	4,673	37.5	228	60	158	11	......	20	37	22	89

FOR FIFTEEN YEARS —(*Continued*).

Croup and diphtheria.	Diarrheal diseases.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrheal).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.!!
480	113	1,972	1,207	108	617	611	776	1,159	270	461	443	1,180
439	175	1,944	1,239	86	660	664	834	1,287	286	544	508	1,284
585	136	1,333	1,093	93	644	577	745	1,056	265	487	427	1,271
390	157	1,459	1,149	83	628	669	903	1,022	270	503	413	1,250
202	205	1,474	1,193	93	647	644	852	1,066	326	555	400	1,155
368	113	1,357	1,054	80	637	716	935	1,001	386	478	449	1,211
223	127	1,576	1,127	84	695	757	915	1,171	375	478	469	1,193
203	122	1,389	1,169	92	716	763	912	1,117	359	555	484	1,249
290	157	1,892	1,284	96	786	797	983	1,200	392	581	492	1,405
263	236	1,406	1,224	92	649	769	1,114	1,195	434	590	415	1,285
243	259	1,673	1,135	86	586	885	1,179	1,098	501	633	388	1,139
275	249	1,722	1,139	107	590	874	1,228	1,185	429	685	360	1,376
286	247	2,011	1,297	116	643	985	1,264	1,420	487	708	425	1,375
193	211	1,548	1,288	126	610	894	1,206	1,218	465	674	384	1,405
278	226	1,880	1,228	120	653	1,026	1,329	1,195	512	764	394	1,738
30[illegible]	676	1,060	1,005	89	692	449	693	1,132	248	545	368	1,080
359	478	1,010	1,065	67	612	503	679	1,108	241	564	381	1,073
575	739	1,037	982	84	723	583	718	1,180	307	628	419	1,354
338	627	825	974	63	665	592	718	927	275	620	357	1,188
362	915	877	1,097	69	793	625	782	947	290	551	385	1,205
354	503	945	1,002	83	784	643	864	1,037	325	530	362	1,178
174	372	857	1,007	96	783	656	780	1,031	367	581	361	1,062
236	686	883	1,028	76	869	709	746	1,087	408	661	409	1,192
243	477	1,058	1,070	90	874	705	807	1,057	397	637	358	1,265
246	450	965	1,111	97	596	751	957	981	418	723	379	1,259
228	636	944	980	74	570	758	1,041	949	411	646	338	1,328
264	560	894	978	88	576	757	970	924	450	594	320	1,480
250	544	1,007	1,136	96	562	818	1,008	1,095	410	1,695	331	1,432
166	643	971	1,105	95	616	801	1,022	999	488	658	336	1,487
173	441	1,233	1,141	95	686	853	1,143	1,098	500	781	277	1,027
340	3,629	861	1,093	96	1,264	556	700	1,348	266	842	417	1,503
379	3,206	746	1,073	72	1,219	552	726	1,252	300	598	383	1,333
470	3,258	688	1,094	64	1,184	527	638	1,282	296	683	392	1,468
323	2,974	627	1,040	83	1,135	599	732	1,000	322	549	364	1,425
293	3,086	785	1,050	72	1,267	661	842	1,169	349	649	409	1,541
258	2,396	693	941	92	1,114	569	804	1,090	323	750	416	1,381
159	2,298	710	1,116	67	1,244	646	793	1,118	380	762	388	1,279
193	2,068	748	1,076	70	1,428	755	690	981	396	645	402	1,405
208	2,082	726	1,102	75	1,446	727	798	1,016	431	857	377	1,354
125	2,231	602	1,062	78	609	776	821	1,175	434	2,020	409	1,372
180	2,038	752	1,038	86	632	741	953	1,000	434	745	375	1,467
234	1,815	846	991	94	627	808	1,052	1,054	463	900	371	1,449
207	2,479	678	1,146	144	677	841	969	1,117	460	783	349	1,760
147	2,664	715	1,090	124	824	864	1,055	1,124	526	1,062	350	1,760
150	1,821	847	1,107	115	927	904	1,218	981	523	969	265	1,672
275	2,328	704	1,056	73	985	512	662	1,208	279	572	369	1,301
328	2,406	663	1,040	73	986	534	676	1,167	283	600	432	1,314
383	2,068	621	1,031	71	945	573	626	1,011	395	543	405	1,331
305	2,303	668	1,051	67	1,027	523	741	1,034	357	597	457	1,404
257	2,326	636	1,059	69	1,062	644	802	1,113	294	1,695	508	1,518
249	1,799	597	1,027	92	1,023	617	803	879	387	600	387	1,265
124	2,345	613	1,019	67	1,288	651	749	1,062	390	709	430	1,349
171	1,535	599	1,034	75	1,091	679	736	955	394	576	433	1,271
198	1,985	577	1,047	84	1,244	681	773	995	436	777	379	1,443
142	2,555	509	1,078	81	693	629	831	993	411	683	361	1,568
161	2,089	664	984	80	608	728	865	994	443	733	365	1,491
157	1,750	543	1,025	82	737	709	976	959	470	683	325	1,624
171	2,011	630	1,075	78	732	759	963	922	513	738	306	1,819
127	2,134	673	1,090	98	919	830	1,083	962	535	772	367	1,655
104	2,339	765	1,074	106	928	937	1,135	975	526	963	367	1,840

MORTALITY OF THE MONTHS

MONTHS.	Total number of deaths.	Deaths under five years.	Percentage of deaths under five years to total deaths.	Epidemic deaths per 1,000 deaths from all causes.	Cerebrospinal fever.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
September:												
1892	9,695	3,760	38.8	235	48	282	74	9	78	37	16	94
1893	9,346	3,718	39.8	248	49	227	63	23	34	24	11	85
1894	9,525	3,948	41.5	244	28	229	51	9	33	15	11	102
1895	10,011	4,161	41.5	250	52	220	50	......	26	36	15	119
1896	9,467	3,396	36.0	197	44	221	65	......	26	31	11	102
1897	9,588	3,432	35.5	188	51	157	34	......	31	19	12	76
1898	11,481	4,320	37.5	230	47	333	82	......	26	20	6	120
1899	9,186	3,068	33.4	172	57	205	21	......	19	34	6	85
1900	10,251	3,760	36.7	220	41	245	41	......	12	21	16	66
1901	10,269	3,668	35.7	283	25	210	47	11	32	14	14	60
1902	9,682	3,218	32.6	195	30	179	20	6	31	17	15	83
1903	9,468	2,838	30.0	171	29	170	18	......	34	6	12	51
1904	10,293	3,289	31.9	170	85	179	17	......	33	24	20	31
1905	10,580	3,353	31.6	173	96	178	9	......	34	24	7	70
1906	11,565	3,934	34.0	195	59	222	18	......	23	22	13	74
October:												
1892	9,092	2,894	31.8	174	35	205	72	27	96	26	18	78
1893	8,981	2,994	33.4	185	56	253	50	19	65	14	16	56
1894	9,008	2,936	32.5	180	22	234	46	5	32	15	6	72
1895	9,320	2,951	31.5	167	36	265	50	2	36	46	13	95
1896	8,676	2,451	28.2	130	27	195	57	......	35	37	12	67
1897	9,080	2,055	22.6	135	30	173	44	......	49	33	15	59
1898	9,632	2,868	30.0	140	37	281	49	......	38	10	14	59
1899	9,280	3,175	34.2	110	46	202	27	1	36	24	17	60
1900	9,676	3,864	29.6	146	36	283	37	......	24	24	13	54
1901	9,738	2,627	27.0	150	25	235	40	14	38	20	17	53
1902	9,475	2,537	27.0	132	34	225	18	4	56	17	6	61
1903	9,786	2,458	25.0	123	31	194	12	......	45	27	13	31
1904	9,906	2,477	25.0	120	75	201	13	1	56	25	11	26
1905	10,222	2,695	26.5	125	65	198	9	......	29	14	10	56
1906	11,364	3,038	26.7	129	55	232	20	......	20	17	17	75
November:												
1892	8,448	2,540	30.1	167	39	184	50	18	127	51	26	77
1893	8,458	2,324	27.5	157	45	180	30	27	77	56	14	50
1894	8,159	2,254	27.6	151	25	189	30	10	52	15	17	53
1895	8,372	2,287	27.4	134	24	204	43	......	51	96	18	57
1896	7,888	2,165	37.5	113	25	132	21	......	48	45	18	44
1897	8,325	2,045	24.5	108	31	151	28	......	62	63	12	27
1898	8,709	1,970	22.7	90	36	189	30	1	32	18	17	52
1899	8,607	2,187	25.4	101	38	169	25	......	54	75	26	47
1900	8,715	2,178	25.0	110	38	233	26	1	33	32	12	50
1901	9,309	2,097	22.6	110	26	147	23	9	81	49	6	39
1902	9,010	2,086	23.2	100	15	208	10	20	63	19	10	44
1903	10,009	2,157	21.7	100	23	165	9	3	64	48	17	37
1904	10,185	2,116	20.8	80	75	147	12	......	63	46	21	27
1905	10,333	2,163	20.6	77	65	141	6	......	37	49	19	48
1906	10,539	2,390	22.6	87	54	194	12	......	29	31	32	46
December:												
1892	9,528	2,754	28.9	146	24	147	40	17	195	82	22	82
1893	10,600	2,834	26.7	117	46	158	27	35	106	70	25	73
1894	9,000	2,567	28.5	133	33	139	35	11	82	35	34	53
1895	9,438	2,772	29.5	134	31	169	34	......	75	172	34	72
1896	9,074	2,378	26.0	112	28	126	30	......	63	50	20	59
1897	9,180	2,195	25.0	97	28	160	20	......	91	61	26	43
1898	10,877	2,269	21.0	70	35	156	22	......	53	38	18	59
1899	9,833	2,441	25.0	93	39	155	18	2	69	88	33	72
1900	9,889	2,310	23.3	105	37	263	16	7	60	81	21	53
1901	10,373	2,579	24.8	104	38	166	24	15	81	126	30	52
1902	10,347	2,447	23.6	97	20	182	5	44	85	39	33	57
1903	11,075	2,009	18.2	90	41	137	9	2	103	50	44	40
1904	11,463	2,587	22.5	85	113	136	13	......	93	65	46	28
1905	11,135	2,397	21.5	135	95	165	5	......	56	55	28	44
1906	12,075	2,565	21.2	77	52	136	15	......	63	48	34	63

FOR FIFTEEN YEARS —(*Concluded*).

Croup and diphtheria.	Diarrheal diseases.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrheal).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
374	1,266	854	1,023	69	887	502	644	1,008	280	469	461	1,208
411	1,395	713	912	68	863	528	597	1,026	268	443	391	1,221
389	1,454	668	988	54	852	492	612	970	268	488	399	1,413
322	1,672	675	1,009	65	923	577	703	988	277	522	452	1,308
294	1,077	826	1,023	57	848	556	810	905	306	543	417	1,305
259	1,171	785	998	70	949	602	825	933	327	651	421	1,217
135	1,872	768	1,076	70	1,162	647	856	1,116	378	927	478	1,262
183	972	755	947	50	1,065	646	729	937	366	537	327	1,245
154	1,656	645	980	72	1,143	727	705	905	405	605	420	1,392
183	1,808	582	1,021	58	673	705	815	958	417	577	402	1,657
166	1,390	835	917	80	622	686	899	995	314	589	512	1,306
186	1,103	765	946	69	634	710	907	944	475	681	322	1,396
178	1,267	743	991	70	739	748	971	999	493	683	344	1,678
125	1,310	715	1,056	84	820	823	1,069	1,006	476	735	359	1,604
126	1,693	909	997	98	821	889	1,148	1,005	526	760	283	1,879
551	491	1,132	996	62	709	547	694	1,024	263	448	420	1,198
599	533	947	1,070	58	771	542	658	1,010	273	422	363	1,206
551	635	901	1,013	54	757	540	690	959	298	452	477	1,249
458	554	749	1,112	67	761	630	767	840	319	511	445	1,564
361	338	1,123	990	70	689	605	908	815	323	455	437	1,132
370	444	1,090	1,070	79	717	608	820	911	358	568	437	1,205
180	687	1,044	1,052	65	943	673	848	1,015	376	526	443	1,292
254	361	1,163	1,064	57	832	753	810	1,017	394	550	417	1,195
228	712	967	1,078	62	955	760	830	934	376	540	429	1,334
260	733	916	1,112	59	659	792	923	991	424	527	425	1,475
215	613	985	1,027	61	610	777	1,040	1,039	416	571	406	1,294
256	598	968	1,038	87	617	791	1,038	1,044	456	668	369	1,503
203	576	1,075	1,069	77	611	766	1,115	991	507	658	384	1,456
161	732	919	1,115	95	653	856	1,112	1,041	510	710	394	1,463
195	828	1,340	1,090	87	820	931	1,308	1,167	548	721	316	1,577
697	137	1,445	940	55	582	490	674	845	244	377	382	1,008
700	152	1,242	957	57	595	429	691	925	242	411	469	1,009
703	146	1,131	1,022	48	567	575	662	883	262	383	394	991
483	150	1,348	979	71	583	584	750	798	263	473	370	1,027
429	132	1,184	876	66	524	599	828	772	330	443	355	1,017
339	191	1,153	977	78	605	667	867	841	308	432	418	1,075
242	165	1,288	1,049	54	625	681	918	998	380	456	451	1,027
307	132	1,274	1,027	61	642	729	832	916	370	457	412	1,014
304	231	1,172	1,011	66	694	758	764	955	390	412	401	1,132
331	300	1,203	1,063	74	537	841	1,002	1,000	[illegible]	478	364	1,326
248	254	1,327	951	61	541	689	997	1,043	419	625	374	1,092
323	288	1,573	1,076	91	566	864	1,124	1,056	415	612	381	1,274
241	205	1,573	1,104	74	597	905	1,155	1,043	540	609	404	1,344
203	229	1,516	1,131	98	574	882	1,278	1,045	478	735	393	1,406
239	262	1,687	1,094	101	621	915	1,243	1,089	528	719	278	1,365
673	113	1,737	1,145	78	575	572	779	1,132	259	404	416	1,036
678	123	2,445	1,099	80	581	610	792	1,078	254	359	724	1,237
672	103	1,555	1,117	58	551	628	719	1,033	269	384	401	1,088
563	115	1,740	1,054	79	596	609	931	866	306	510	399	1,083
520	127	1,454	1,062	66	604	673	899	927	330	495	443	1,098
335	122	1,540	1,056	61	610	679	952	981	344	427	501	1,118
244	141	2,250	1,185	71	657	845	1,091	1,177	369	479	562	1,425
331	112	1,793	1,088	82	648	789	941	1,085	416	451	437	1,184
358	143	1,587	1,082	78	733	793	970	1,113	413	467	454	1,160
341	213	1,923	1,050	94	562	835	1,103	1,123	442	491	454	1,210
319	210	1,624	1,023	82	613	881	1,137	1,165	458	557	465	1,348
314	279	2,051	1,152	84	582	914	1,250	1,182	478	595	400	1,368
300	177	2,011	1,144	84	635	932	1,327	1,258	462	580	419	1,640
245	226	1,892	1,155	127	591	939	1,352	1,136	542	653	438	1,391
269	182	2,299	1,179	120	719	1,108	1,582	1,220	504	782	305	1,395

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — MARITIME DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	EPIDEMIC DISEASES. Cerebro-spinal menin-gitis.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysip-elas.	Whoop-ing cough.	Diph-theria.	Diar-rhea.
1885	55,021	......	22,436	......	233	488	718	28	989	948	230	694	3,207	5,828
1886	57,420	......	24,668	......	246	483	687	37	790	790	223	880	4,103	5,243
1887	61,715	......	25,289	......	232	528	658	171	933	988	217	283	4,654	6,501
1888	64,421	......	27,513	......	201	558	519	153	2,012	670	240	820	4,378	5,900
1889	65,037	......	27,691	......	243	638	468	......	1,661	700	209	993	4,098	*5,596
1890	67,512	......	26,781	......	170	625	444	2	562	972	216	681	3,314	5,576
1891	74,681	......	30,620	......	311	658	381	1	1,858	940	243	678	3,466	6,146
1892	74,590	......	30,905	......	364	634	412	142	1,499	1,093	278	640	3,573	6,422
1893	75,027	......	29,561	......	652	657	337	252	939	538	227	905	3,837	5,998
1894	71,055	......	29,826	......	254	561	300	281	784	829	206	594	5,066	5,647
1895	74,246	21.2	30,303	......	335	566	281	11	626	1,023	238	853	3,830	5,992
1896	75,789	21.5	29,122	......	291	594	333	3	566	1,106	200	722	3,403	5,413
1897	67,646	18.9	25,804	......	332	535	285	27	726	621	192	508	2,881	4,744
1898	71,196	20.0	26,908	......	401	724	296	1	727	529	150	801	1,786	5,285
1899	70,384	18.4	25,751	......	414	578	185	18	550	600	241	565	2,008	3,905
1900	75,989	19.5	27,625	......	310	760	240	11	479	863	325	616	2,393	4,292
1901	76,030	20.0	25,649	7,818	257	775	222	426	1,178	469	208	334	2,147	7,114
1902	73,325	18.6	25,494	7,310	264	809	138	322	968	737	193	661	2,111	6,187
1903	73,011	18.0	22,926	7,531	271	697	100	7	758	520	205	376	2,262	5,465
1904	84,164	20.0	28,445	8,727	1,432	726	111	9	877	916	265	227	2,189	6,322
1905	79,671	18.2	26,173	8,201	2,142	714	67	9	484	552	269	454	1,652	6,593
1906	82,544	18.2	27,427	*12,371	846	689	85	6	513	1,184	313	434	1,971	6,185

* At 60 years and over.

Mortality in the Sanitary Districts since 1885 — Maritime District — (*Concluded*).

Year	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	7,896	8,036	648	2,813	3,095	2,863	5,252	1,087	1,989	2,909	5,056
1886	8,069	8,269	557	3,034	3,241	2,941	5,329	1,171	2,094	3,076	6,138
1887	7,546	8,517	560	3,457	3,480	3,197	6,102	1,317	2,289	3,437	6,652
1888	7,996	9,654	650	3,643	3,589	3,486	6,729	1,349	2,126	2,177	7,646
1889	8,014	9,619	599	3,866	3,491	3,653	6,665	1,358	2,157	1,491	8,897
1890	8,621	7,504	586	4,379	3,886	3,872	6,691	1,543	2,507	1,518	10,468
1891	8,373	13,638	666	4,737	4,334	4,368	7,123	1,522	2,900	1,569	10,791
1892	8,250	12,771	716	5,105	4,260	4,469	7,463	1,609	3,225	1,620	10,043
1893	8,359	13,472	600	5,099	4,583	4,609	7,558	1,614	3,030	1,543	10,218
1894	7,796	10,414	521	5,266	4,416	4,189	6,851	1,655	3,282	1,442	10,701
1895	8,319	11,683	513	5,463	4,755	5,413	5,580	1,805	3,784	1,371	11,764
1896	8,314	11,328	591	5,374	4,920	5,586	5,570	1,894	4,684	1,459	10,522
1897	7,204	9,768	536	5,221	4,938	5,455	5,435	2,031	3,672	1,322	10,813
1898	8,191	10,677	533	6,314	5,368	5,020	6,370	2,174	3,901	1,417	10,298
1899	8,546	11,264	529	6,309	5,813	4,788	6,255	2,302	3,639	1,594	10,281
1900	8,650	13,240	744	6,804	6,115	4,931	6,049	2,449	4,150	1,456	11,112
1901	8,730	11,010	656	3,270	6,171	5,888	6,241	2,651	4,996	1,455	11,832
1902	8,080	11,798	662	3,242	6,141	6,438	5,970	2,557	4,074	1,307	10,666
1903	8,582	11,620	688	3,113	6,255	6,445	5,775	2,828	4,405	1,025	11,614
1904	9,124	14,665	848	3,471	6,926	6,882	6,631	2,967	5,514	1,187	12,775
1905	9,096	11,946	875	3,812	6,616	7,159	6,331	3,151	4,812	984	12,153
1906	9,540	13,694	824	4,324	7,093	7,789	6,162	3,288	5,214	1,084	11,356

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — HUDSON VALLEY DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths und five years of age.	Deaths at 70 years and over.	Epidemic Diseases. Cerebro spinal menin-gitis.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysip-elas.	Whoop-ing cough.	Diph-theria.	Diar-rhea.
1885	8,941	......	2,688	......	86	249	95	3	63	109	25	48	580	560
1886	9,639	......	2,991	......	145	263	64	1	70	70	32	141	597	612
1887	9,895	......	2,864	......	135	270	79	4	109	49	25	41	579	706
1888	11,015	......	3,248	......	93	355	80	7	231	48	23	85	708	740
1889	11,106	......	3,222	......	58	257	96	......	324	108	18	68	722	681
1890	10,893	......	2,713	......	67	222	87	1	48	6	26	159	363	443
1891	12,209	......	3,092	......	71	372	85	......	94	84	24	102	378	720
1892	13,147	......	5,411	......	79	248	60	......	299	113	50	46	741	783
1893	12,174	......	3,074	......	70	288	65	......	213	41	27	86	507	690
1894	11,733	......	2,966	......	69	264	54	20	161	28	19	142	367	741
1895	148	18.7	3,217	......	70	402	49	......	84	96	34	110	340	767
1896	12	19.0	2,975	......	52	314	50	......	31	125	45	68	329	891
1897	11,822	17.7	2,625	......	52	247	36	......	11	32	23	50	327	610
1898	11,776	17.6	2,574	......	92	332	49	......	25	17	19	105	212	714
1899	11,854	1..0	2,499	......	84	318	31	1	26	53	30	75	231	625
1900	12,432	17.4	2,870	......	55	350	27	......	41	134	36	120	259	843
1901	11,926	17.5	2,309	2,744	43	238	32	6	79	56	25	49	234	471
1902	11,070	16.0	2,150	2,533	35	251	25	14	50	20	14	88	175	467
1903	11,619	16.7	2,175	2,752	34	178	19	1	86	35	30	104	136	384
1904	12,461	18.0	2,450	2,981	73	246	14	......	35	94	22	58	163	451
1905	12,408	17.6	2,542	2,830	126	206	11	......	44	119	23	93	149	537
1906	12,026	17.0	2,384	*3,845	[illegible]	[illegible]	26	......	17	56	27	76	162	422

* At 60 years and over.

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — HUDSON VALLEY DISTRICT—(*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	1,295	1,059	99	496	370	717	1,216	238	333	523	767
1886	1,330	1,167	99	706	370	844	964	232	386	722	798
1887	1,331	946	107	642	326	957	955	233	413	1,187	801
1888	1,258	1,230	85	674	415	900	1,152	264	412	1,417	965
1889	1,454	1,310	83	725	458	1,043	1,134	291	425	1,090	815
1890	1,329	747	74	818	528	1,002	1,401	292	411	841	833
1891	1,343	2,053	81	912	545	1,045	1,539	300	505	990	957
1892	1,369	2,167	104	867	587	1,069	1,687	330	561	894	1,093
1893	1,244	1,827	114	872	600	1,117	1,577	356	536	853	1,091
1894	1,305	1,570	90	816	731	997	1,512	332	542	796	1,180
1895	1,298	1,696	79	823	711	1,026	1,634	356	476	805	1,184
1896	1,414	1,574	52	876	715	1,119	1,649	404	577	766	1,125
1897	1,316	1,755	78	863	783	1,241	1,632	425	521	765	1,056
1898	1,258	1,492	82	827	772	1,254	1,719	419	578	785	1,025
1899	1,313	1,541	62	822	756	1,251	1,646	415	582	765	1,227
1900	1,373	1,606	75	857	781	1,276	1,668	476	531	731	1,193
1901	1,342	1,519	87	968	774	1,324	1,657	456	657	720	1,186
1902	1,180	1,279	61	837	811	1,458	1,493	497	629	594	1,092
1903	1,259	1,391	73	847	939	1,556	1,509	536	707	586	1,209
1904	1,346	1,403	68	959	941	1,542	1,617	535	660	624	1,510
1905	1,286	1,401	88	951	948	1,506	1,591	549	802	600	1,378
1906	1,126	1,531	81	916	966	1,495	1,524	580	702	523	1,544

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — ADIRONDACK AND NORTHERN DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	EPIDEMIC DISEASES. Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	2,428	......	626	......	20	47	12	1	19	11	11	28	175	113
1886	2,479	......	616	......	25	51	5	......	19	18	9	40	110	144
1887	2,969	......	710	......	36	71	11	......	28	16	19	20	147	189
1888	3,435	......	823	......	36	63	10	3	39	30	8	8	160	208
1889	3,129	......	735	......	13	72	15	......	9	16	6	34	106	194
1890	3,825	......	795	......	19	51	12	......	12	25	10	32	145	166
1891	4,131	......	888	......	23	81	18	......	23	10	12	12	141	286
1892	4,534	......	924	......	34	89	13	......	23	50	15	23	133	208
1893	4,367	......	881	......	13	89	9	......	43	14	11	41	177	186
1894	4,435	......	890	......	29	100	4	......	25	6	18	31	123	255
1895	4,263	13.0	904	......	18	108	4	......	29	2	9	22	79	226
1896	4,447	13.0	862	......	29	77	......	......	24	41	15	16	121	237
1897	5,257	14.5	1,011	......	23	96	6	......	6	27	11	28	132	240
1898	5,187	14.7	984	......	27	122	5	......	3	30	9	43	59	307
1899	5,332	14.0	994	......	37	139	4	......	19	2	10	44	54	270
1900	5,430	14.2	1,083	......	36	152	5	......	23	48	25	24	74	393
1901	5,611	14.0	1,155	1,582	31	97	3	4	35	83	22	36	93	229
1902	4,981	13.0	937	1,454	30	99	5	9	28	25	14	24	46	167
1903	5,305	13.4	927	1,518	26	112	3	2	22	14	18	18	57	204
1904	5,728	14.5	1,056	1,754	27	128	......	1	29	3	15	32	65	131
1905	5,996	15.0	1,266	1,750	31	109	3	......	11	67	11	68	42	258
1906	6,161	15.1	1,251	*2,325	31	115	6	......	12	19	22	36	67	209

*At 60 years and over.

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — ADIRONDACK AND NORTHERN DISTRICT — (*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	359	268	38	149	84	209	253	66	89	217	269
1886	342	220	51	177	98	193	262	92	92	323	212
1887	366	236	32	169	79	182	253	112	106	626	268
1888	381	371	48	226	78	221	817	94	102	743	290
1889	381	330	32	216	117	237	364	110	114	484	289
1890	415	554	38	298	130	287	370	115	132	454	370
1891	460	478	37	323	171	388	433	128	177	556	388
1892	482	603	38	356	174	439	518	133	178	567	458
1893	459	561	44	340	197	402	508	157	163	523	430
1894	510	504	47	326	225	435	514	145	165	501	472
1895	488	459	55	323	195	445	532	173	179	480	437
1896	520	453	35	338	248	472	561	192	215	432	426
1897	571	672	50	377	321	594	627	213	241	539	483
1898	581	551	55	436	304	567	678	212	239	502	462
1899	525	693	39	404	319	552	669	212	207	586	549
1900	539	616	46	399	318	573	678	234	231	470	546
1901	564	703	45	441	322	627	708	208	249	488	628
1902	521	459	42	399	311	591	681	229	262	469	570
1903	493	515	46	446	342	676	685	239	270	480	637
1904	552	545	55	415	351	790	754	255	289	452	839
1905	583	614	65	500	376	717	682	288	314	486	771
1906	550	689	56	466	380	791	782	278	346	409	897

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — MOHAWK VALLEY DISTRICT.

YEAR	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over	EPIDEMIC DISEASES. Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	3,174	......	647	......	32	62	19	......	19	36	20	12	142	183
1886	3,559	......	946	......	54	78	22	......	38	......	13	29	131	192
1887	4,359	......	1,089	......	33	89	14	......	32	25	8	21	294	321
1888	4,594	......	1,106	......	19	101	19	......	18	22	9	20	301	283
1889	4,643	......	1,152	......	32	99	17	1	30	26	11	28	249	305
1890	5,178	......	1,151	......	32	159	32	......	41	21	9	20	273	292
1891	5,978	......	1,310	......	25	166	23	......	62	26	13	30	188	315
1892	6,356	......	1,278	......	28	178	23	......	90	33	17	30	290	264
1893	5,497	......	1,231	......	19	118	16	......	67	22	16	25	209	293
1894	5,375	......	1,286	......	19	112	13	1	64	1	16	38	151	350
1895	5,358	15.3	1,133	......	24	106	7	......	25	1	16	36	60	297
1896	5,714	16.4	1,300	......	35	135	6	......	23	109	22	49	86	388
1897	5,611	16.0	1,025	......	20	96	5	......	13	25	11	21	109	244
1898	5,883	15.5	1,185	......	40	128	3	......	10	24	12	30	89	382
1899	6,087	15.5	1,060	......	32	90	3	1	13	3	12	52	114	256
1900	6,164	15.5	1,375	......	26	139	5	2	18	67	15	50	132	405
1901	6,455	16.0	1,195	1,737	28	110	4	4	25	49	25	37	142	264
1902	6,089	15.0	1,252	1,609	26	84	1	2	77	16	11	10	121	264
1903	6,534	15.1	1,358	1,755	28	101	1	2	60	17	18	79	97	280
1904	6,846	16.0	1,389	1,915	41	85	......	......	78	16	15	36	108	268
1905	6,768	15.4	1,396	1,931	73	82	4	......	38	34	16	24	67	276
1906	7,230	16.3	1,631	*2,620	43	88	4	1	50	10	25	54	106	322

*At 60 years and over.

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — MOHAWK VALLEY DISTRICT—(*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	456	366	41	185	111	263	452	99	115	293	268
1886	471	359	30	286	146	266	426	115	143	460	300
1887	485	364	33	274	156	319	474	165	173	712	367
1888	530	469	43	265	167	330	473	166	212	768	385
1889	527	477	30	303	189	436	549	180	187	631	412
1890	582	693	41	403	228	414	694	154	209	691	400
1891	646	813	44	445	297	524	771	194	230	694	438
1892	661	909	50	443	294	575	850	209	257	699	458
1893	564	702	40	403	323	523	728	200	237	527	465
1894	602	596	34	430	303	462	729	176	254	500	525
1895	608	607	45	389	360	529	715	207	228	536	557
1896	596	655	42	422	340	551	720	189	273	502	574
1897	533	759	62	432	359	570	789	243	277	541	503
1898	606	591	43	427	408	617	828	264	305	482	541
1899	549	807	45	468	431	691	802	255	284	555	824
1900	559	713	46	479	386	625	798	295	331	453	620
1901	608	887	48	512	438	677	828	267	340	473	689
1902	517	631	38	506	426	703	859	282	401	440	668
1903	570	673	49	497	488	775	911	276	371	408	773
1904	579	756	58	550	467	817	878	314	433	481	866
1905	588	778	47	511	488	844	826	331	396	496	846
1906	523	856	62	598	569	893	924	310	441	399	952

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — SOUTHERN TIER DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases.									
					Cerebro-spinal meningitis.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	1,741	......	404	......	10	41	21	......	20	18	14	14	48	97
1886	1,852	......	442	......	10	49	25	......	10	5	13	10	76	111
1887	2,513	......	580	......	19	76	33	......	24	6	11	8	111	178
1888	3,276	......	700	......	23	93	42	......	34	32	9	13	112	177
1889	3,390	......	684	......	20	115	24	1	34	10	7	22	117	196
1890	3,854	......	786	......	23	91	22	......	30	35	8	58	136	207
1891	4,648	......	839	......	22	132	10	1	34	32	7	12	195	248
1892	4,934	......	880	......	24	107	7	......	46	14	13	25	248	207
1893	4,838	......	940	......	28	105	8	......	68	51	17	19	294	241
1894	4,862	......	993	......	27	126	12	2	32	6	15	55	192	281
1895	4,780	12.0	930	......	15	118	13	......	7	13	18	33	99	242
1896	4,754	13.0	678	......	18	152	9	......	11	14	12	10	74	239
1897	5,523	14.0	811	......	8	75	11	......	13	27	16	51	91	204
1898	5,462	14.0	891	......	16	112	18	......	15	36	11	35	72	327
1899	5,930	14.0	860	......	30	121	3	......	28	11	6	39	75	225
1900	5,918	14.0	1,003	......	21	141	10	......	28	34	14	42	115	323
1901	5,982	14.0	951	1,784	21	107	8	......	19	33	19	67	80	170
1902	5,811	14.0	987	1,807	19	101	6	6	30	29	23	20	121	198
1903	5,966	13.9	943	1,767	17	111	5	......	29	13	14	60	75	178
1904	6,792	15.5	1,032	1,135	19	93	7	1	59	58	22	21	103	152
1905	6,425	14.5	1,003	1,989	27	77	8	......	18	9	29	36	71	184
1906	6,443	14.7	1,137	*2,694	25	124	7	......	9	4	16	52	61	241

*At 60 years and over.

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — SOUTHERN TIER DISTRICT — (*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	199	195	31	132	51	145	253	68	86	135	163
1886	187	180	27	141	58	151	233	83	86	207	190
1887	236	233	31	175	57	169	292	74	140	415	225
1888	330	384	31	229	117	230	317	112	166	530	277
1889	300	361	35	254	128	282	416	120	147	436	355
1890	345	539	42	292	131	323	451	139	239	444	299
1891	412	651	36	377	177	415	566	151	233	549	378
1892	438	743	50	391	229	484	565	172	251	548	372
1893	372	584	52	376	239	472	594	164	250	513	391
1894	394	547	53	427	241	452	586	191	235	500	485
1895	413	606	36	370	274	485	574	182	251	559	452
1896	411	501	37	438	291	543	618	217	275	503	391
1897	390	624	66	452	339	623	694	260	332	533	427
1898	401	548	45	444	366	643	780	253	332	546	462
1899	485	699	45	506	374	737	792	280	295	631	548
1900	452	648	52	448	414	683	794	287	308	544	560
1901	441	716	35	499	423	673	838	261	368	550	654
1902	431	574	49	510	407	787	830	259	350	512	549
1903	378	569	53	496	387	902	784	309	385	509	692
1904	459	720	54	570	477	939	906	338	446	550	798
1905	431	675	50	544	441	905	844	342	439	521	779
1906	395	647	49	508	501	935	874	331	383	430	851

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — EAST CENTRAL DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	EPIDEMIC DISEASES.									
					Cerebro-spinal menin-gitis.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysip-elas.	Whoop-ing cough.	Diph-theria.	Diar-rhea.
1885	2,444	......	537	......	26	48	21	1	10	14	11	8	80	146
1886	2,947	......	610	......	20	81	19	1	8	5	26	8	119	151
1887	3,465	......	765	......	12	71	40	......	17	17	12	28	106	196
1888	4,222	......	949	......	22	121	37	1	39	53	13	16	182	307
1889	4,290	......	921	......	23	103	39	15	52	16	11	21	145	346
1890	4,918	......	973	......	24	91	25	......	24	36	4	34	112	281
1891	5,113	......	1,066	......	28	135	24	......	25	19	14	17	89	350
1892	5,467	......	1,054	......	29	78	25	1	26	14	27	22	172	254
1893	5,493	......	1,114	......	21	100	17	......	26	71	17	34	257	264
1894	5,224	......	1,060	......	22	116	10	1	23	1	17	28	160	334
1895	5,422	15.5	1,087	......	24	107	17	......	33	4	15	25	71	292
1896	5,371	15.4	1,070	......	27	96	12	......	40	17	11	15	111	336
1897	5,758	16.0	1,042	......	30	70	8	......	21	62	12	39	126	222
1898	5,745	16.0	1,019	......	15	123	14	......	22	35	13	21	91	309
1899	5,687	14.0	788	......	22	107	5	......	14	5	13	38	47	195
1900	5,796	14.0	1,028	......	22	110	10	......	19	47	22	38	61	395
1901	5,801	14.5	894	1,821	21	104	4	2	27	75	14	29	64	181
1902	5,481	14.0	852	1,765	20	72	1	......	9	10	13	30	44	182
1903	5,781	14.3	878	1,870	12	70	1	......	14	30	10	50	50	160
1904	6,422	16.0	961	2,094	30	80	2	......	38	24	20	10	59	135
1905	6,464	15.5	1,082	2,005	48	70	9	......	57	24	20	17	36	207
1906	6,371	15.4	1,124	*2,604	23	59	1	......	26	19	10	56	44	229

*At 60 years and over.

Mortality in the Sanitary Districts since 1885 — East Central District — (*Concluded*).

Year.	Other Causes of Death.										
	Consumption.	Acute respiratory. diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	342	286	22	149	86	197	291	89	104	212	301
1886	388	321	46	209	101	251	335	110	139	387	224
1887	410	324	47	193	123	274	376	107	166	730	216
1888	467	391	68	237	138	348	446	152	178	762	254
1889	476	434	69	267	176	377	497	158	150	660	244
1890	533	732	44	344	197	454	503	178	227	575	496
1891	546	612	38	380	275	431	616	172	214	717	412
1892	536	780	42	429	256	558	686	195	248	668	441
1893	537	733	48	418	268	551	662	192	243	587	445
1894	565	555	50	406	278	503	649	233	244	539	490
1895	534	655	31	416	316	593	682	255	294	537	552
1896	502	579	40	428	309	640	690	258	266	503	495
1897	557	708	51	464	345	738	757	268	280	538	468
1898	519	615	36	461	361	707	761	305	310	536	491
1899	485	744	41	464	352	719	763	310	275	581	507
1900	513	583	34	470	378	720	760	329	276	474	535
1901	563	649	49	457	360	798	765	295	261	528	555
1902	482	514	51	478	415	786	783	306	287	441	560
1903	479	626	45	458	414	885	773	314	322	468	600
1904	567	734	38	482	459	900	843	325	345	535	796
1905	576	664	42	471	488	970	863	335	352	499	716
1906	491	656	34	464	489	938	831	343	388	438	832

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — WEST CENTRAL DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	EPIDEMIC DISEASES.									
					Cerebro-spinal menin-gitis.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysip-elas.	Whoop-ing-cough.	Diph-theria.	Diar-rhea.
1885	1,812	......	306	......	15	45	24	......	3	3	12	7	41	90
1886	2,056	......	383	......	14	42	22	......	5	1	6	15	42	112
1887	2,474	......	457	......	8	47	24	......	......	4	12	11	76	144
1888	2,950	......	412	......	24	51	20	2	27	11	8	2	69	112
1889	2,918	......	459	......	14	58	24	4	23	4	7	11	79	136
1890	3,660	......	602	......	15	64	17	1	24	55	9	28	60	163
1891	4,040	......	519	......	18	72	11	2	30	10	11	15	36	153
1892	4,349	......	556	......	20	61	18	......	23	8	19	22	84	124
1893	3,865	......	600	......	12	61	14	......	32	14	12	19	167	146
1894	3,868	......	562	......	17	65	16	1	23	3	12	12	62	158
1895	4,019	13.4	573	......	13	82	13	......	8	5	14	18	56	179
1896	4,086	13.0	638	......	9	54	20	......	21	20	11	20	39	217
1897	4,351	14.5	560	......	21	45	14	......	9	14	14	18	59	137
1898	4,243	14.3	610	......	9	39	11	......	7	10	7	23	24	219
1899	4,565	14.0	568	......	25	50	8	......	21	9	9	7	60	159
1900	4,461	14.0	654	......	13	91	5	......	15	24	6	27	70	253
1901	4,577	14.3	624	1,646	10	60	6	......	10	29	12	46	28	128
1902	4,448	14.0	593	1,577	12	50	8	6	5	3	15	23	33	156
1903	4,822	15.0	608	1,710	6	116	5	......	6	15	20	16	40	128
1904	4,970	15.5	620	1,871	13	65	6	......	7	13	22	7	48	130
1905	5,073	16.0	712	1,894	18	57	4	......	9	22	12	28	37	175
1906	4,917	15.6	722	*2,292	18	62	4	......	9	13	7	23	27	179

*At 60 years and over.

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — WEST CENTRAL DISTRICT—(*Concluded*).

YEAR.	OTHER CAUSES OF DEATH.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	281	196	22	138	85	167	275	58	80	218	152
1886	290	178	24	115	94	151	295	72	93	306	179
1887	285	192	23	149	94	162	256	94	101	594	198
1888	330	234	28	185	102	223	339	87	118	749	229
1889	322	293	18	200	137	255	366	104	146	510	227
1890	391	466	21	291	200	361	440	144	153	509	250
1891	428	443	32	312	204	430	529	169	184	639	322
1892	441	599	40	333	197	499	612	171	193	564	287
1893	409	418	35	309	203	386	511	156	187	457	317
1894	459	370	25	313	336	466	537	153	166	448	326
1895	398	468	27	350	255	461	520	162	160	493	337
1896	375	379	30	337	268	510	642	177	182	430	345
1897	392	507	48	359	289	563	677	199	234	441	311
1898	384	421	33	373	322	530	635	218	216	421	341
1899	395	567	23	355	246	635	697	213	211	486	389
1900	375	418	28	346	285	594	658	232	224	415	382
1901	363	526	32	364	305	625	711	227	235	416	444
1902	341	430	30	351	288	710	678	246	251	399	413
1903	355	491	30	379	300	727	732	276	293	420	467
1904	357	513	33	378	352	758	757	250	296	438	527
1905	352	477	30	419	362	726	760	291	294	466	534
1906	315	494	38	399	318	752	729	276	313	357	584

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885 — LAKE ONTARIO AND WESTERN DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases.									
					Cerebro-spinal menin-gitis.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysip-elas.	Whoop-ing cough.	Diph-theria.	Diar-rhea.
1885	4,745	......	1,258	......	24	99	31	......	53	31	31	22	235	285
1886	7,448	......	2,629	......	70	133	63	......	74	6	36	41	434	598
1887	9,065	......	3,370	......	65	175	70	......	124	100	23	35	528	1,018
1888	10,530	......	3,887	......	72	243	86	46	123	69	32	30	538	1,047
1889	9,726	......	3,397	......	81	208	63	9	68	19	24	126	348	840
1890	11,120	......	3,860	......	107	250	89	......	64	109	29	43	363	844
1891	12,988	......	4,270	......	91	306	67	......	126	79	35	54	556	961
1892	11,820	......	4,331	......	71	269	55	......	171	25	58	112	675	923
1893	12,649	......	4,242	......	60	267	27	......	238	38	39	74	499	1,238
1894	11,721	......	3,941	......	50	295	16	2	115	26	33	114	472	1,217
1895	11,519	15.5	3,534	......	47	227	24	......	38	123	26	72	454	1,041
1896	11,193	15.0	3,367	......	49	188	19	......	43	53	22	86	437	1,055
1897	11,368	15.3	3,021	......	51	187	15	......	44	66	24	110	390	865
1898	11,446	15 4	2,842	......	92	224	18	......	27	7	16	97	179	956
1899	11,981	13.7	2,867	......	58	201	9	1	59	73	32	66	197	845
1900	12,278	14.0	3,240	......	48	205	7	1	66	116	23	103	202	1,055
1901	12,875	15.0	2,983	3,098	81	250	4	3	57	65	38	123	238	780
1902	12,292	14.0	2,930	2,753	50	252	5	83	48	89	31	67	208	694
1903	13,498	15.0	3,120	3,017	60	280	3	29	82	77	39	108	318	681
1904	13,921	15.5	3,171	3,268	73	229	9	2	71	46	49	35	306	740
1905	14,254	15.2	3,844	3,238	101	239	5	......	65	161	35	127	242	722
1906	14,649	15.5	3,614	*4,081	124	247	6	......	54	64	32	90	253	841

*At 60 years and over.

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—LAKE ONTARIO AND WESTERN DISTRICT—(*Concluded*)

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	617	460	73	280	189	337	658	177	198	390	555
1886	937	707	55	441	226	488	1,047	204	304	579	1,005
1887	950	750	52	540	267	479	1,249	259	389	975	1,017
1888	1,091	1,033	116	687	320	666	1,397	275	528	848	1,283
1889	1,016	1,029	107	670	341	688	1,285	307	503	778	1,336
1890	1,180	1,623	80	889	389	696	1,417	313	564	653	1,419
1891	1,347	1,989	119	1,000	560	868	1,598	392	596	816	1,634
1892	1,281	1,839	91	986	505	905	1,618	333	630	824	1,449
1893	1,179	1,510	121	1,017	542	982	1,688	393	649	823	1,265
1894	1,204	1,324	90	769	521	959	1,565	425	595	785	1,144
1895	1,209	1,552	113	758	583	1,014	1,487	414	547	788	1,001
1896	1,133	1,355	105	742	680	1,078	1,465	459	569	762	893
1897	1,075	1,482	122	792	693	1,116	1,509	495	615	835	882
1898	1,038	1,394	103	814	749	1,173	1,549	530	634	830	1,017
1899	1,114	1,623	93	837	773	1,231	1,553	548	600	870	1,198
1900	1,129	1,408	111	841	824	1,274	1,588	569	663	859	1,186
1901	1,155	1,579	116	967	765	1,337	1,618	665	820	814	1,400
1902	1,030	1,301	101	913	805	1,412	1,670	624	807	787	1,315
1903	1,078	1,454	126	1,046	873	1,595	1,797	678	893	809	1,472
1904	1,175	1,596	118	1,041	842	1,681	1,756	713	839	853	1,747
1905	1,152	1,475	180	954	974	1,720	1,672	768	943	871	1,848
1906	1,086	1,611	182	1,067	1,027	1,800	1,695	763	1,087	692	1,928

MORTALITY OF THE STATE SINCE 1885.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	EPIDEMIC DISEASES.									
					Cerebro-spinal menin-gitis.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysip-elas.	Whoop-ing cough.	Croup and diph-theria.	Diar-rhea.
1885	80,407	......	30,027	......	446	1,067	944	33	1,184	1,170	354	834	4,508	7,301
1886	86,801	......	32,928	......	572	1,169	890	39	1,011	895	357	1,244	5,597	7,028
1887	96,453	......	35,114	......	540	1,327	935	175	1,267	1,205	327	447	6,490	9,258
1888	104,450	......	38,345	......	490	1,483	813	212	2,452	944	342	994	6,448	8,774
1889	104,233	......	40,243	......	402	1,550	746	30	2,205	899	293	1,303	5,855	8,294
1890	116,830	......	37,392	......	474	1,612	738	4	913	1,161	312	1,156	4,915	8,468
1891	123,790	......	42,740	......	589	1,926	619	4	2,252	1,200	367	825	5,072	9,179
1892	126,302	......	42,434	......	649	1,664	613	143	2,177	1,350	477	921	5,918	9,185
1893	123,908	......	41,643	......	875	1,685	493	252	1,626	789	366	1,203	5,947	9,056
1894	118,195	......	41,472	......	489	1,640	422	308	1,227	900	331	1,020	6,592	8,956
1895	121,735	......	42,002	......	546	1,716	409	11	850	1,266	370	1,169	4,989	9,055
1896	120,683	18.5	40,136	......	510	1,542	449	3	759	1,495	340	996	4,597	8,776
1897	117,078	18.4	35,771	......	538	1,351	380	27	841	873	303	825	4,115	7,267
1898	120,938	18.1	37,113	......	695	1,810	404	1	837	838	237	1,155	2,612	8,499
1899	121,831	17.3	35,386	......	702	1,604	248	21	730	756	353	886	2,786	6,480
1900	128,468	17.8	39,204	......	531	1,948	309	14	689	1,333	466	1,020	3,306	7,959
1901	129,257	17.8	35,775	22,233	492	1,741	283	445	1,430	859	363	721	3,026	9,337
1902	123,494	17.0	31,215	20,709	456	1,318	189	442	1,215	929	314	923	2,859	8,315
1903	126,536	16.7	32,768	22,050	454	1,665	137	41	1,057	721	354	811	3,035	7,480
1904	141,304	18.2	39,086	24,742	1,708	1,652	149	13	1,194	1,170	430	426	3,041	8,329
1905	137,059	17.4	38,045	23,783	2,566	1,554	106	9	726	988	415	847	2,296	8,955
1906	140,343	17.1	39,292	*32,734	1,178	1,568	139	7	690	1,369	452	821	2,691	8,578

*At 60 years and over.

MORTALITY OF THE STATE SINCE 1885—(*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	11,238	10,864	974	4,343	4,069	4,069	8,651	1,887	2,994	4,889	7,728
1886	11,947	11,389	884	5,066	4,305	5,238	8,799	2,050	3,296	5,990	8,981
1887	11,609	11,557	885	5,599	4,582	5,737	9,957	2,363	3,780	8,676	9,736
1888	12,383	13,756	1,069	6,146	4,926	6,394	11,174	2,497	3,842	7,094	11,310
1889	12,390	13,833	979	6,501	5,732	6,886	11,266	2,638	3,834	5,980	12,615
1890	13,831	18,053	928	7,696	5,688	7,306	11,593	2,868	4,542	5,484	18,728
1891	13,445	20,647	1,053	8,486	6,473	8,480	13,166	3,028	5,028	6,530	15,371
1892	13,471	20,432	1,131	8,920	6,502	9,013	14,009	3,152	5,543	6,385	14,647
1893	13,123	19,807	1,054	8,834	6,955	9,042	13,826	3,232	5,295	5,826	14,622
1894	12,824	15,885	911	8,745	6,946	8,451	12,948	3,305	5,487	5,497	15,310
1895	13,267	17,725	939	8,892	7,449	9,966	11,724	3,554	5,889	5,569	16,380
1896	13,265	16,820	972	8,955	7,770	10,486	11,925	3,789	7,022	5,377	14,835
1897	12,641	16,277	1,013	8,963	7,866	10,905	12,124	4,131	6,172	5,516	14,950
1898	12,979	16,350	920	10,101	8,641	10,511	13,312	4,385	6,520	5,524	14,641
1899	13,412	17,938	877	10,163	9,064	10,606	13,177	4,533	6,093	6,068	15,324
1900	13,590	19,232	1,136	10,644	9,501	10,676	12,993	4,871	6,714	5,402	16,134
1901	13,766	17,589	1,068	7,478	9,558	11,949	13,366	5,033	7,926	5,439	17,388
1902	12,582	16,986	1,034	7,235	9,604	12,889	12,964	4,990	7,058	4,949	15,833
1903	13,194	17,339	1,110	7,282	9,998	13,561	12,966	5,456	7,646	4,765	17,466
1904	14,159	21,132	1,272	7,866	10,815	14,309	14,142	5,697	8,822	5,120	19,858
1905	14,061	17,832	1,377	8,158	10,697	14,547	13,569	6,056	8,352	4,923	19,025
1906	14,027	20,178	1,326	8,741	11,344	15,395	13,521	6,168	8,874	4,332	18,944

Population of the Sanitary Districts by U. S. Census

	1890.	1900.	1905.
Maritime district	2,778,630	3,753,614	4,523,940
Hudson Valley district	679,647	690,000	705,500
Adirondack and Northern district	379,577	394,772	408,100
Mohawk Valley district	368,503	408,974	444,740
Southern Tier district	401,954	428,543	439,000
East Central district	382,960	401,092	414,200
West Central district	314,875	315,945	315,700
Lake Ontario and Western district	718,473	876,206	947,500
Entire State	6,024,619	7,269,136	8,198,680

TABLES SHOWING THE RELATIVE MORTALITY OF CERTAIN DISEASES GEOGRAPHICALLY FOR 10 YEARS

In each 1,000 deaths there were from Diarrhea in the —

DISTRICTS.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Maritime	70	74	55	56	93	85	75	76	83	74
Hudson valley	51	60	52	68	40	42	35	36	43	35
Adirondack and Northern	45	60	50	72	41	33	38	23	43	34
Mohawk valley	43	65	42	65	41	44	35	40	41	44
Southern tier	39	60	38	55	30	34	35	23	29	37
East central	38	54	34	68	31	33	28	20	32	36
West central	31	52	34	57	28	35	26	26	35	36
Lake Ontario and Western	76	90	70	86	60	56	50	53	50	57
Entire State	63	70	53	62	72	67	60	60	65	61

In each 1,000 deaths there were from Diphtheria in the —

DISTRICTS.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Maritime	43	21	28	32	28	28	31	26	21	24
Hudson valley	28	18	19	21	20	16	12	13	12	13
Adirondack and Northern	25	11	10	14	17	9	10	11	7	11
Mohawk valley	20	15	19	20	22	20	16	15	11	15
Southern tier	17	13	13	20	13	21	14	19	11	9
East central	22	16	9	10	11	8	9	9	6	7
West central	14	6	12	15	8	8	8	10	7	5
Lake Ontario and Western	34	16	16	16	18	17	22	22	17	17
Entire State	35	22	23	25	23	23	24	21	17	19

In each 1,000 deaths there were from Typhoid Fever in the —

DISTRICTS.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Maritime	8	10	8	10	10	11	10	9	9	8
Hudson valley	21	28	26	28	20	23	14	20	17	15
Adirondack and Northern	18	23	26	26	17	20	21	22	18	19
Mohawk valley	17	22	13	23	17	14	16	13	12	12
Southern tier	14	20	20	24	18	17	20	11	12	19
East central	12	21	19	20	18	13	14	12	11	9
West central	10	10	11	20	13	11	24	13	11	13
Lake Ontario and Western	16	21	17	17	20	20	21	17	17	16
Entire State	12	15	13	17	13	14	14	12	12	11

In each 1,000 *deaths there were from Scarlet Fever in the* —

DISTRICTS.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Maritime	9	10	8	6	15	13	10	11	6	6
Hudson valley	1	2	2	4	7	5	7	3	4	1
Adirondack and Northern	1	1	4	4	6	6	4	5	2	2
Mohawk valley	2	2	2	3	4	13	11	11	6	7
Southern tier	2	3	5	5	3	5	5	9	3	1
East central	3	4	3	3	5	2	2	6	9	4
West central	2	2	5	3	2	1	1	1	2	2
Lake Ontario and Western	4	3	5	5	4	4	6	2	5	4
Entire State	7	7	6	5	11	11	8	8	5	5

In each 1,000 *deaths there were from Measles in the* —

DISTRICTS.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Maritime	11	6	10	7	11	7	14
Hudson valley	10	5	2	3	8	9	5
Adirondack and Northern	9	15	5	3	1	11	3
Mohawk valley	11	8	3	3	2	5	1
Southern tier	6	5	5	2	9	2	1
East central	8	13	2	5	4	4	3
West central	5	6	3	3	3	4	3
Lake Ontario and Western	10	5	7	6	3	11	4
Entire State	10	6	8	9	10	8	10

In each 1,000 *deaths there were from Pneumonia in the* —

DISTRICTS.	1903.	1904.	1905.	1906.
Maritime	89	110	125	137
Hudson valley	70	78	75	79
Adirondack and Northern	57	60	66	74
Mohawk valley	64	73	77	76
Southern tier	55	70	70	60
East central	64	83	75	61
West central	60	72	70	65
Lake Ontario and Western	51	65	65	60
Entire State	80	95	104	109

In each 1,000 *deaths there were from Bright's Disease in the* —

DISTRICTS.	1903.	1904.	1905.	1906.
Maritime	67	65	71	71
Hudson valley	57	62	62	62
Adirondack and Northern	40	50	50	45
Mohawk valley	53	55	60	58
Southern tier	40	53	52	55
East central	48	56	58	53
West central	35	55	58	44
Lake Ontario and Western	40	50	50	47
Entire State	60	62	65	64

Reported mortality from Cancer in the sanitary districts for 10 years —

DISTRICTS.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Maritime	2,031	2,174	2,302	2,449	2,651	2,557	2,828	2,967	3,151	3,288
Hudson valley	425	419	415	476	453	497	536	535	549	580
Adirondack and Northern	213	212	212	234	208	220	239	255	288	278
Mohawk valley	242	264	255	295	267	282	276	314	331	310
Southern tier	260	253	280	287	261	259	309	338	342	331
East central	268	305	310	329	295	304	314	325	335	343
West central	199	218	213	232	227	246	276	250	291	276
Lake Ontario and Western	495	530	548	569	665	624	678	713	768	763
Entire State	4,133	4,375	4,535	4,871	5,033	4,989	5,456	5,697	6,055	6,109

Deaths from Cancer per 100,000 *population —*

DISTRICTS.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Maritime	58	57	62	66	65	61	71	72	72
Hudson valley	60	56	68	67	72	77	78	78	82
Adirondack and Northern	54	54	60	53	58	60	64	75	68
Mohawk valley	67	65	74	65	67	66	73	76	69
Southern tier	60	64	65	63	60	72	78	78	75
East central	74	74	79	74	76	79	80	80	82
West central	70	65	71	71	78	86	80	90	87
Lake Ontario and Western	61	61	65	75	71	75	78	81	80

In each 1,000 *deaths there were from Cancer in the —*

DISTRICTS.	Decade 1885–1894.	Decade 1895–1904.	1905.	1906.
Maritime	21.6	31.8	39.4	30.9
Hudson valley	25.8	37.6	44.2	48.1
Adirondack and Northern	32.0	42.0	48.0	45.1
Mohawk valley	34.2	42.5	48.8	42.8
Southern tier	35.5	46.5	53.5	51.3
East central	36.4	51.8	52.0	53.8
West central	37.5	49.5	57.2	56.1
Lake Ontario and Western	30.2	46.5	54.0	52.1
Entire State	25.0	37.0	44.2	43.9

In each 1,000 *deaths there were from Violence in the —*

DISTRICTS.	Decade 1885–1894.	Decade 1895–1904.	1905.	1906.
Maritime	39.0	57.7	53.5	63.1
Hudson valley	40.7	49.3	64.6	58.3
Adirondack and Northern	36.7	46.2	52.3	56.1
Mohawk valley	43.5	53.1	68.8	60.9
Southern tier	51.0	55.5	67.0	59.4
East central	44.0	50.0	54.5	60.9
West central	44.5	51.7	58.0	63.6
Lake Ontario and Western	48.5	57.0	66.2	74.2
Entire State	40.3	55.8	61.0	63.2

Reported mortality from Pulmonary Tuberculosis in the State since 1895

YEAR.	Population.	Total deaths.	Deaths from pulmonary tuberculosis.	Annual death rate per 1,000.	Percentage of all deaths due to pulmonary tuberculosis.
1896	6,513,343	120,683	13,265	18.5	11.0
1897	6,513,343	117,078	12,641	18.0	10.8
1898	6,513,343	120,972	12,979	18.6	10.7
1899*	7,110,000	121,821	13,412	17.1	11.0
1900	7,268,000	128,468	13,590	17.7	10.6
1901	7,268,000	129,257	13,766	17.8	10.6
1902*	7,467,050	123,494	12,582	16.5	10.2
1903*	7,614,281	126,536	13,194	16.6	10.4
1904*	7,746,000	141,304	14,159	18.2	10.0
1905	8,067,308	137,059	14,061	17.0	10.3
1906*	8,198,500	140,773	14,027	17.1	10.0

* Population estimated.

In each 1,000 *deaths there were from Pulmonary Tuberculosis in the* —

DISTRICTS.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Maritime	110	106	115	135	114	115	110	117	110	113	115
Hudson valley	115	112	115	110	110	113	107	100	108	104	93
Adirondack and Northern	116	108	112	99	100	110	105	92	96	97	89
Mohawk valley	104	95	106	91	90	93	85	90	85	87	73
Southern tier	86	75	75	83	76	75	75	65	69	67	61
East central	93	96	90	85	90	96	90	80	87	90	77
West central	90	90	90	87	84	80	77	75	71	70	64
Lake Ontario and Western	101	95	100	93	92	90	85	80	85	82	7
Entire State	110	108	108	110	110	106	102	104	100	100	100

DIVISION OF COMMUNICABLE DISEASES, 1906

DIVISION OF COMMUNICABLE DISEASES

Smallpox

During the past year there were filed with the Department reports of 480 cases of smallpox as follows:

PLACE.	County.	Cases reported.	Total.
C— Albany	Albany	2 June	2
C— Cohoes	Albany	14 July, 6 August	20
T— New Hudson	Cattaraugus	1 October	1
T— Mina	Chautauqua	1 May, 3 June	4
T— Copake	Columbia	2 February	2
T— Colchester	Delaware	1 October	1
T— Dover	Dutchess	1 April	1
C— Buffalo	Erie	1 Jan., 1 March, 1 May	3
T— West Seneca	Erie	1 March	1
T— Batavia	Genesee	1 Feb., 1 March, 1 July, 1 August	4
T— Athens	Greene	1 April, 42 May, 32 June, 4 July, 1 August	80
V— Catskill	Greene	13 March, 13 April, 20 May 36 June, 16 July, 5 Aug., 2 Oct., 4 Nov., 4 Dec.	113
T— Durham	Greene	3 June, 3 July, 1 August	7
T— Stark	Herkimer	1 February	1
V— Fort Plain	Montgomery	5 February	5
T— Root	Montgomery	4 February, 6 March	10
C— Greater New York	....	2 Jan., 1 Feb., 4 March, 11 April, 11 May, 22 June, 2 July, 5 Aug., 8 Sept., 2 Oct., 3 Nov., 25 Dec.	96
T— Newfane	Niagara	1 June	1
C— North Tonawanda	Niagara	1 August	1
T— Whitestown	Oneida	1 February	1
V— Canandaigua	Ontario	5 November	5
T & V— Naples	Ontario	7 Nov., 3 Dec	10
V— Jordan	Onondaga	1 October	1
V— Goshen	Orange	1 January	1
C— Middletown	Orange	9 April, 1 October	10
T— Wallkill	Orange	1 September	1
T— Laurens	Otsego	1 Nov., 6 Dec	7
V— Oneonta	Otsego	1 January	1
C— Troy	Rensselaer	6 Nov., 3 Dec	9
V— Haverstraw	Rockland	2 April, 1 May, 2 June	5
V— Nyack	Rockland	2 March	2
V— Pearl River	Rockland	5 March	5
T— Half Moon	Saratoga	1 August	1
V— Mechanicville	Saratoga	8 July	8
T— Saratoga Springs	Saratoga	1 June	1
T— Stillwater	Saratoga	1 February	1
T— Reading	Schuyler	8 December	8
V— Avoca	Steuben	6 November	6
T— Bath	Steuben	2 July, 3 Aug., 2 Sept., 2 Dec.	9
V— Bath	Steuben	1 July, 2 Aug., 1 Dec	4
T— Hartsville	Steuben	3 Sept., 2 Oct., 4 Nov	9
C— Hornell	Steuben	1 Sept., 4 Oct., 3 Nov	8
T— Rockland	Sullivan	3 Aug., 7 Sept	10
T— Lansing	Tompkins	1 Nov., 2 Dec	3
T— Sodus	Wayne	1 October	1
Total	....	....	480

Classifying the cases by month of occurrence we have 5 in January, 16 in February, 33 in March, 37 in April, 76 in May, 102 in June, 51 in July, 29 in August, 22 in September, 15 in October, 40 in November, and 54 in December.

Examining all the detailed reports, 353 in number, we find that 13 had been vaccinated within 15 days, 5 within 15 days to 6 months, 26 within 15 years, 40 not within 15 years (most of them adults vaccinated in infancy), and 6 vaccinated, the date of vaccination not being specified. Fourteen cases had been unsuccessfully vaccinated at some time in their lives. *Two hundred and thirty-three cases* (66 *per cent.*) *had never been vaccinated.* Sixteen reports were defective as to data concerning vaccination.

It must be remembered that an unsuccessful vaccination does not necessarily indicate a natural immunity. Defect in technic on the part of the vaccinator or vaccine of poor quality often accounts for the failure "to take." Of those vaccinated within fifteen days, some had probably acquired the disease before vaccination took place. So that it is probably true to say that 70 per cent. of the cases reported were unprotected at the time of exposure by natural or acquired immunity.

These figures should emphasize the value of vaccination and the importance of vaccinating every child in infancy and again at the beginning of adolescence.

Special investigations of outbreaks of smallpox were made by representatives of the Department at Bath, Canandaigua, Catskill, Athens, Laurens, Livingston Manor, Monroe, Nyack and Watkins.

In a report on an investigation at Nyack, F. C. Curtis, M.D., medical expert, stated that the disease was brought from Northern New Jersey, where smallpox was said, on good authority, to be prevalent, and suggested the danger that menaced the residents of New York city from this source.

An investigation into an outbreak of smallpox at Cementon in the township of Catskill developed the fact that the town board hesitated to employ rigorous quarantine measures through fear of claims for recompense for detention from employment. Dr. J. T. Wheeler, representing the Department, called the town board together, and employed a local lawyer to read and expound the law, and himself emphasized the duty of executing the law

promptly and thoroughly at the very outset, leaving the adjustment of claims to be settled afterward. As the result of this tactful handling of the situation the board became convinced of the wisdom and economy of undertaking to stamp out the disease at the outset, and set to work at it energetically.

The epidemic at Bath was complicated by the refusals of some of the local physicians to agree to a diagnosis of smallpox until Dr. F. C. Curtis, a medical expert of the Department, saw a number of the cases and pronounced them to undoubtedly be smallpox.

The type of disease prevalent during the year was of a very mild character, and this led to errors in diagnosis in many instances, while several cases passed through the disease without recognition, and thus the proper measures for the prevention of communication were not instituted.

Scarlet Fever

Two outbreaks of scarlet fever required the special attention of this Department during the year. The most serious one occurred at Salem, N. Y., and the following is an abstract of the report made upon the same by Medical Expert Dr. F. C. Curtis, on December 20, 1906:

By conference with the health officer, Dr. James H. Maguire, I find that the present outbreak of scarlet fever at Salem, Washington county, began about two months ago with mild cases that were not recognized, and that the nature of the disease was recognized six weeks ago. Since that time nearly fifty cases have developed. The height of the outbreak was reached early and a large number of cases occurred during the first weeks.

Soon after its discovery and when it was widespread especially, the public school was closed and kept so for two or three weeks. During this time it was repeatedly fumigated with formaldehyde. It has now been open for two weeks but with very limited attendance, as I found on visiting it, partly on account of the number of families in which the disease still exists and partly from fear of others to send children yet. It is the only school in the village and is a graded school with a normal attendance of 250, a considerable number coming from outside the village. While it

is a serious matter to close a school, it appears to have been justified in this case. The headway of the epidemic was in the first instance through the school whence it appears to have been distributed by attendance of early mild unrecognized cases.

The epidemic is one of scarlet fever and mild and very severe cases have occurred in its course. Some of the cases have been denominated German measles by the attending physician. Such a diagnosis of any case there is untenable and every case must be regarded as scarlet fever and quarantined as such whether mild or not. Probably some spread has been due to laxity in this direction. I would suggest that to strengthen the hands of the local health officer a letter be sent to all the physicians of Salem, directing them to report all cases of eruptive fever for the present and to co-operate with the health board in sustaining a quarantine of everything of this class of sickness as if it were an undoubted case of scarlet fever; it is certainly no time to make fine-drawn diagnoses which are at any rate, to say the least, likely to be erroneous if other than the prevailing one of this disease.

The epidemic is abating as for two weeks few new cases have developed. The quarantine is not enforced by a guard stationed at each house, all being quarantined in their own houses; the health officer thinks, however, that it has been observed and that he has the co-operation of the people and that his quarantine has been pretty faithfully observed. The chief trouble will be with mild cases that may occur and escape his observation or even that of any attending physician. I believe that there will be few more new cases and that the outbreak will soon come to an end.

There is very little scarlet fever in the surrounding country about Salem.

This outbreak illustrates a great difficulty which confronts public health workers, namely the difficulty of obtaining knowledge of and controlling the activities of cases of infectious diseases so mild in character that they never come to the attention of physicians. It will only be controlled by the education of the public to the seriousness of allowing any mild illness occurring during an epidemic to go undiagnosed or unreported to some physician or the health officer.

The other serious outbreak occurred in Gowanda, N. Y. at the time of outbreak of diphtheria in the Gowanda State Hospital, located in the same village. The presence of both diseases occasioned some local alarm, and Medical Expert Dr. A. D. Lake was asked to investigate and report upon the same. The following is an abstract of his report, dated November 3, 1906:

"I find there are only seven cases here. The first of these appeared about four weeks ago in the person of a child attending the public school, and as far as I can ascertain all the other cases are in children who occupy the same room in the school building, except the extension in one family from a preceding case.

I met the health board and health officer yesterday, and as a result of this conference I am satisfied that the cases now under observation, as well as others, if such should occur, will be kept under thorough control and no occasion for criticism will arise."

On November 2 the health officer, Dr. H. Babcock, also made a report, of which the following is an abstract:

"I have received your letter of November 1st, saying that we had twelve cases of scarlet fever in this place and but little was being done to prevent spreading of disease.

About four weeks ago had a single case, no more occurred until the twenty-fifth of last month. The disease occurred in two families in a distant part of the village. I quarantined them at once.

Ever since my return from Syracuse I have kept busy attending to quarantining houses, personally inspecting all of the cases suspected, and doing all things in my power to limit the disease.

We have in all, inclusive of the first case four weeks ago, seven cases of scarlet fever and no more, and they have all existed in five houses. The house where first one was has been well fumigated and cleansed."

DIPHTHERIA

During the year there have been two noteworthy epidemics of diphtheria reported to this Department.

The first occurred in the Gowanda State Homeopathic Hospital, Dr. Daniel H. Arthur, Superintendent.

The nature of this outbreak is well illustrated by the reports

made to this Department by Medical Expert Dr. A. D. Lake, of Gowanda, of which the following are abstracts:

Pursuant to your instructions, transmitted to me through Dr. Edwin H. Wolcott, director of the division of contagious diseases, I have visited the Gowanda State Homeopathic Hospital and investigated the epidemic of diphtheria now existing there.

This institution is located one mile west of the village of Gowanda and is in the health district of the town of Collins, Erie county, N. Y. The group of buildings making up the hospital are located on an elevation which secures excellent natural drainage and all the surroundings are exceptionally sanitary. The water supply is obtained from springs located on the Cattaraugus Reservation about one mile from the institution and the water is forced into the tower by compressed air. There is no possibility of contamination of this water. There is a fine sewer system discharging into the Cattaraugus creek a mile or more from the hospital. The population of the institution is 1,045, including the staff, employees, attendants and patients.

The present epidemic began October 16, 1906. The first patient, an attendant in one of the male wards, had just returned from a visit at Markhams, about eight miles away, but had been absent from the hospital only thirty hours. It was said that he had some slight illness when he left the hospital, which was discovered on his return to be diphtheria. The next case occurred in the same ward three days after the first. From these a series of cases followed, all confined to four wards. Twenty-six cases have occurred up to this date, five of them discovered to-day. In nearly all instances the disease is of moderate severity. The patients are all isolated and quarantined in a cottage fifteen hundred feet away from the nearest building in the group. They are all treated by antitoxin, the initial dose in most instances being 4,000 units. All of the patients and attendants in the ward where the disease has developed have received immunizing doses, 325 individuals having been thus treated.

On the appearance of the first case a thorough system of bacteriological investigation was begun and continued. Up to this date 344 cultures have been made and bacilli have been discovered in the throats of eleven individuals who have manifested no other signs of the disease. Two of the hospital staff are giving their entire time to this work.

The quarantine is well maintained under the direction of Health Officer Atwood of Collins. Four people escaped the quarantine October 31st. Three of them were speedily traced, one being found in the village of Collins and quarantined there, and two others were located in Cattaraugus.

The board of health of that town was notified and it is supposed that these cases are also in quarantine. The fourth man is thought to have reached Buffalo and the health department there was informed of this suspicion and are endeavoring to locate him.

In my opinion the epidemic is being exceedingly well managed, both on the part of the hospital and the health department of Collins.

As you direct, I will keep the Department informed day by day of any further developments.

Responding to your request to keep the Department informed of the progress of the epidemic of diphtheria at the Gowanda State Homeopathic Hospital, I beg leave to state as follows:

Two additional cases have occurred since my previous report, making a total of twenty-eight.

Snyder, one of the men who escaped quarantine, was arrested in Buffalo and detained by the health department there until a culture could be made from his throat. This proving to be negative, he was discharged. Gardiner, who was arrested in Collins and has been in quarantine there for about a week, has developed no signs of illness. Health Officer Atwood was directed by the State Department of Health to keep this man under observation for two weeks. It was only possible to do this by establishing a guarded quarantine, which has been done. Dr. Atwood now asks permission to raise the quarantine in his case, after two negative cultures have been made at an interval of two days. I recommend that this course be pursued. Will you please advise me if this action will be satisfactory to the Department?

P. S.— Dr. Potter has just telephoned me that still another case has been discovered at the hospital in a ward which has not heretofore been invaded. An additional force has at once been put to work fumigating this and other wards.

I have the honor to report the further progress of the epidemic of diphtheria at the Gowanda State Homeopathic Hospital.

Since my report of November 4th only two additional cases have occurred, making a total of thirty-one. One of the two last cases was Lyon, an attendant, who had been exposed to infection and refused to be immunized by an injection of antitoxin. The other came down on a ward which had not before been infected. There are 125 patients on this ward, and all of these were immediately immunized.

Six cases have recovered. In each of these three negative cultures of the secretions of both nose and throat were made before they were discharged.

Gardiner, whose case was referred to in my last report, is still in quarantine at Collins, he having refused to permit a culture to be made from his throat.

I am glad to be able to state that the epidemic seems to be subsiding. About half of the population of the institution have been immunized, and, as before stated, only two cases have appeared during the past week. The disease still remains of a mild character, and no deaths have occurred.

The quarantine is still rigidly enforced, and none have escaped since my last report.

Concerning the cause and the management of this outbreak the superintendent, Dr. Arthur, wrote to the Department on October 23d as follows:

I wish to report to you the presence at this hospital of six cases of diptheria. Attendant Elmer E. Warner was taken down with disease on Tuesday, the 16th inst. Mr. Warner had been feeling badly for several days and had gone to his home for over Sunday, but at that time there was no evidence of diptheria. He had not been away from the institution for three weeks previous to this time, and there is no doubt that the disease was contracted here.

We have thus far confined the disease to one ward, ward 13, with the exception of my private secretary, who was taken down with it Saturday last. Ward 13 is composed altogether of patients who have been transferred to this institution from other hospitals for the insane, patients who have no friends, and in consequence there have been no visitors to that ward. On October 2d we received fifty patients transferred from the Manhattan State Hospital. Twelve of these, who were mildly disturbed cases, were placed on ward 13. As they have had diptheria at the Manhattan State Hospital last spring, there is a probability that the disease was brought in the clothing of some of these patients, as we are unable to trace it otherwise. Upon careful inquiry throughout the neighborhood, we find there is no diphtheria in any of the small towns or in the country. All persons developing the slightest symptoms we have placed in a room by ing diphtheria bacilli have been segregated in a cottage in the vicinity of the power-house and cared for by trained nurses. We have had no deaths and all of these cases are improving. A thorough system of disinfecting and fumigating has been kept up

throughout the institution according to the rules and regulations laid down by the State Board of Health. I have quarantined the institution from the towns and vicinity around according to the advice of the director of contagious diseases, Dr. D. H. Wolcott. I called Dr. Wolcott to the hospital Saturday last and went over the matter, and concluded that we are doing all that is possible to control the disease.

NEW YORK STATE DEPARTMENT OF HEALTH,

ALBANY, *October* 30, 1906.

This is to certify that owing to the present epidemic of diphtheria in the Gowanda State Homeopathic Hospital the New York State Department cf Health places this institution under the most rigid quarantine until further notice.

EUGENE H. PORTER, M.D.,
State Commissioner of Health

Six copies of this were sent to the hospital by request of Dr. Arthur.

The second outbreak occurred in Millbrook, N. Y., and the following is an abstract of the report made by Medical Expert Dr. J. T. Wheeler on May 19, 1906:

At Millbrook at 5 P. M. I found Dr. S. J. Jacobus, who reported as follows:

He was called May 11th to see a child who had been sick, but in attendance upon school, since May 8th. He found extensive deposits in throat involving larynx. The cervical glands were swollen en masse, suggesting mumps. There was profound systemic infection. He used antitoxin on patient and preventively on other members of the family. The child died May 12th. He disinfected house with formaldehyde. May 13th a child of a neighbor had a mild case, and after antitoxin was used the membrane disappeared. The premises were disinfected on Monday.

Immunizing doses were given to the rest of family. There are no other cases in this locality.

According to the diagnosis of physicians follicular tonsillitis has been prevalent. Dr. Jacobs as health officer made the diagnosis of diphtheria in these cases and his diagnosis was sustained by the Bender Laboratory reports of cultures. He quarantined both families in which it was present. He closed and disinfected the schoolhouse with formaldehyde. I have advised him to await developments before opening school and to direct teachers to send home all children who appear at all sick and report to me. The other doctors of the place and the health board are co-operating with Dr. Jacobus.

I was so impressed by Dr. Jacobus' thoroughly intelligent and adequate management that I did not consider an independent verification of facts necessary.

TETANUS

A record of tetanus mortality in this State since August, 1904, occurring outside the cities of New York, Buffalo, Albany and Yonkers up to May, 1906, is at hand. The number of such deaths in that time was sixty-four, this not including fatal cases of tetanus neonatorum.

There were four deaths under the age of 5 years; twenty between 5 and 20 years; twenty-eight between 20 and 60 years; and twelve over 60 years of age. The sex of the decedents was 77 per cent. male, forty-nine male to fifteen female.

Of forty-five deaths recorded for the year ending April, 1906, six occurred in January; in February, three; March, one; April, four; May, two; June, two; July, nine; August, five; September, four; October, five; November, three; December, one. Thus, in the spring months there were seven deaths, in the summer sixteen, in the fall twelve and in the winter ten. The winter mortality is exceptional by the six deaths in January, but not produced by a local epidemic; the year before had a larger summer and smaller winter mortality.

Of chief interest is the locality of distribution of this small contributor to the mortality of the State. The sixty-four cases

were reported from thirty-five localities. Poughkeepsie reports four deaths from tetanus, Newburgh three, Hempstead and Southampton each two, Watertown, Cohoes, Amsterdam, Syracuse and Rochester also two each during the period. There are reports from two localities on Long Island, two in Westchester county, New Rochelle and White Plains, ten in the Hudson valley district, in Putnam, Orange, Dutchess, Albany and Rensselaer counties; eight in the northern district of the State, in Warren, Washington, Franklin, Essex and Jefferson counties; Binghamton, Lestershire, Owego, Olean, Almond and Cheektowaga in the southern tier counties along the Pennsylvania line. These comprise the localities in which tetanus has occurred and doubtless very well illustrate the general distribution of the disease and the points of its chief occurrence in this State.

Typhoid Fever

The Department was called upon to investigate eleven outbreaks of typhoid fever during the year. These occurred in the following places: Canastota, Lockport, Whitehall, Wellsville, Reynoldsville, Fort Edward, Gouverneur, Kerhonkson, Corinth, Solvay and Castleton.

Canastota

This outbreak occurred in December, 1905, and January, 1906, and was investigated by Mr. Eric T. King under the direction of Prof. O. H. Landreth, then consulting engineer of the Department. The following is an abstract of the report made by Prof. Landreth on January 15th and gives the essential points worked out by Mr. King.

From the information blank returned by Mr. King it appears that the total number of cases reported and concerning which there is any knowledge was fourteen. One of these cases, No. 3, occurred about August 1st, with a relapse about September 1st; but the remaining thirteen cases occurred between December 12th and January 6th and ten cases occurred between December 15th

December 5th. The first four cases of typhoid occurred on December 12th, 15th, 16th and 17th, with five more on the 20th, which are fully in keeping with the known period of incubation of the disease. Although the infection of the stream entering the reservoir probably occurred suddenly, the infected condition of the water in the reservoir would naturally continue for a considerable time until the infectious material on the watershed became more or less thoroughly removed by rainfall and until the polluted water of the reservoir was displaced by a later unpolluted streamflow.

It will doubtless not be possible, or at least worth while, to prosecute the investigation to a point where the above theory as to the avenue of infection can be absolutely established or rejected, but the important fact remains that the above supposed manner of infection from the railroad is entirely possible and is likely to occur at any time. Added to this is the danger from the possible occurrence of typhoid along the well-populated stream valley. Each of the three great recent epidemics in this State, namely, at Elmira, at Ithaca and at Watertown, occurred in the winter following heavy rains which fell on ground heavily frozen and in which the watershed in each case was known to have been seriously polluted with typhoid matter.

It would appear as if the conclusion was warranted that a sudden short pollution of the water supply of the village was the cause of this outbreak. That the pollution was not continuous is indicated by the fact that the examination of the water on two subsequent occasions failed to show the presence of sewage bacteria. This outbreak emphasizes the necessity for observing the greatest care in protecting a watershed used as a public water supply. It can be said that no such watershed is safe or free from the most serious consequences when the same is passed over by railroads carrying passengers or when the banks of such roads can readily drain into the supply.

Lockport

ALBANY, N. Y., *Jan.* 18, 1906.

PROF. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.*:

DEAR SIR:— This Department has had some correspondence with Dr. J. V. Bickford, health officer of Lockport, regarding cases of typhoid fever existing in that village.

Back in September Dr. Bickford wrote us that he had a case of typhoid fever and asked us to have an examination of the water in the wells which they were using. This examination was made, but failed to disclose any evidence of organic pollution. Another examination of another sample was made later with the same result.

The correspondence regarding the water I have not sent you. I enclose you the correspondence had with Dr. Bickford since that time regarding the cases of typhoid fever. You will note that this correspondence has been carried on by Dr. Curtis.

Please have Mr. King go to Lockport at once and make an investigation of the situation and report to me. Kindly advise Mr. King to call on the health officer and offer his assistance to him and do what else in his power he can to help Dr. Bickford.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health.

From June, 1905, to January 20, 1906, there were 129 known cases of typhoid fever in this city. Of these 86 per cent. occurred in two centers. The details of this outbreak were investigated and reported upon by Mr. Eric T. King on January 23, 1906. The following is his report of January 23d followed by the order issued by the Department to the health officer requiring the correction of the bad sanitary conditions exposed.

" In accordance with instructions given me by letter from O. H. Landreth, consulting engineer, on January 19th, I started that night for Lockport, N. Y. I spent the following three days —

20th to 22d inclusive — in Lockport obtaining such data and making such investigations as were possible to obtain in that time. Fully definite and reliable data were not to be had in respect to ice and milk supplies, but the data is otherwise reliable.

On my arrival I immediately called upon Dr. J. N. Bickford, the local health and city physician, and received from him valuable data. He and six members of the local board accompanied me on the inspection of the infected territory and lent their hearty co-operation throughout.

City Engineer J. F. Forshee furnished the map which accompanies this report and furnished other information concerning sewers, strata, depths of wells, etc.

While the investigation is not exhaustive, the information given in the report appended and by the history of cases accompanying the report will, I hope, serve to point out the cause for the continuation of the epidemic if not the remote source.

General Conditions

Lockport is a city of about 19,000 population. It has no system of water supply for drinking purposes, but supplies water from the Erie canal for other household purposes and for fire services throughout the city. The sewer system comprises the great majority of the streets and carries waste to the various discharge points into a branch of Eighteen Mile creek, the mill pond and Eighteen Mile creek; but the system is not extensively utilized except in the heart of the city; and in that portion of the city where the typhoid is prevalent houses which are connected with the sewers are the exception. The three main sources of drinking water throughout the city are cisterns, wells and springs.

The city generally presents a soiled appearance and frequent garbage dumps are evident to sight and smell.

Typhoid during the past three years has been quite prevalent in the city, though the total absence of statistics makes it impossible to number the cases. The consensus of opinion among the local physicians seems to point to the early autumn of 1905 as the time when its prevalence was especially marked, and when it

seemed to be largely confined to one small district in the city, namely, the northern part of the Fifth ward.

Consequently in preparing a record of cases for this report an endeavor was made to secure all cases which had their beginning subsequent to the 1st of August. One hundred and twenty-nine cases are reported, some half dozen of these, however, dating back into July and June.

Distribution of Typhoid Cases

A classification of all the cases reported by (1) streets and (2) wards shows that somewhat over 86 per cent. of these cases have occurred in two centers, one in the Fifth ward and one in the First. Ninety-two cases occurred in the Fifth ward and twenty in the First. The remaining cases occurred: In the Second ward, one; in the Third ward, four; in the Fourth ward, ten; and in the Sixth ward, two.

The Fifth ward cases were confined to a small area along its northern boundary and the First ward cases occurred for the most part in the territory near and west of the "mill pond."

The occurrence of cases by months were as follows: June, two; July, seven; August, twenty-two; September, twenty; October, eleven; November, twenty-two; December, thirty-five; January to date, ten.

Ward 5

Practically all of the ninety-two cases in this ward are geographically included in the northwest corner of the ward between Adam and Washburn streets and East avenue and the New York Central railroad.

The "branch of Eighteen Mile creek" flows centrally through this area, bringing with it sewage from Pound and Walnut streets. Originally it flowed as an open stream in the bottom of a gully; but it was arched over and buried deep beneath the surface of made ground. It leaves the surface about 100 feet south of East avenue. At East avenue it is some twenty feet under the new

ground surface. Where it crosses Chestnut street it is probably forty feet below the new ground surface and directly under the Lock City brewery, which is built just to the north of Chestnut street on the original ground surface, some forty feet below the present level of Chestnut street. It emerges north from the brewery and flows under its arched cover and artificial mound (without being once exposed) to the mill pond, passing under the Central tracks and the Erie canal. Between McCollum, Spring and Chestnut streets and East avenue the canal is almost entirely "made" land. North of Chestnut street in the block where the brewery is located is a large, deep hollow known as the "Gulf."

The three crosses "X" in red pencil show the three principal sources of water supply for the neighborhood — practically the whole infected district of the Fifth ward — excluding, of course, the few who had private wells or cisterns.

The two crosses to the right, one on either side of Spring street, are the two "brewery springs." The one to the east is a spring some thirty odd feet below ground from which water is drawn with buckets when used. This has not been in use for several months. We call this "B spring 1." "B spring 2" is about 200 feet west of this in the form of a steady jet of water issuing from the rock wall of the gulf near the base of this wall. "B spring 2" is used as a supply for the brewery and for drinking purposes by the majority of the residents on Spring, East Union and Chapel streets. The two springs are not independent but identical, "B spring 1" discharging steadily into the gulf through "B spring 2." The jet is continuous and equivalent to a circular jet of three-fourths inch to one inch diameter. "B spring 1" is in a "back yard," about 150 feet north of the corner of Spring and Chestnut streets. It is within forty feet of two privies, and a radius of 150 feet would include ten outside closets, all in use. Three of these closets were used for the disposition of excreta from typhoid patients. The back yards of houses fronting on three streets approach each other closely at this point.

General conditions of filth prevail, the odors from privies and kitchen waste being very noticeable.

The subsoil here is a ledge of solid limestone rock with a slight dip to the northeast and with fissures running north and south and nearly east and west.

The other main source of local water supply is at the corner of Chestnut and McCollum streets. This is a well from thirty to fifty feet in depth, from which water is pumped in large quantities. This well is even more generally used than the spring, and while the chance for pollution is not as evident as in the case of the spring, still is possible. The nearest privy is 200 feet to the south, and five or six more would be included within 300 feet. Sewers on McCollum and Chestnut streets pass within fifteen or twenty feet of the well, which is in the street.

Two samples were taken from B spring 1, one at the water surface and one from the bottom. One sample was taken from B spring 2. Two samples were taken from the McCollum and Chestnut streets well. All were taken late in the afternoon yesterday and left at the Bender Laboratory early this morning, with instructions to report the findings to you.

The First Ward

The fact that there existed in this ward another "center" of typhoid cases was not brought to my attention till I had correlated the data here in such form as to show it, so that the observation in regard to these cases is necessarily general. It may be said that the Fifth ward drains into the First, and further that the First ward is almost a level tract, especially the region where the cases exist. Here it will be noticed from the case records that the principal source of water for drinking is from private wells. These are shallow wells (ten to eighteen feet) dug through the soft limestone and yielding abundant supplies of water. It will be further noticed that in the Second and Sixth wards combined only three cases were reported, yet these wards are also in the level low land. It might be suggestive, then, that the wells near the mill pond and the creeks might have been contaminated by the drainage from the other infected district.

Disinfection of Excreta

The disinfectants employed upon the excreta were for the most part "Platt chlorides," carbolic acid and bichloride of mercury, but in some cases commercial lime was relied upon. Disinfection cannot be said to have been thoroughly executed. Dr. Bickford has in person made repeated visits to the various cases, and himself aided and instructed in the process, but declared that in many cases the people would not carry out instructions, in one case the disinfectants furnished by the city having been thrown into a neighbor's yard unused. The majority of cases are among the poorer or laboring class, and because personal supervision was impossible for one man, their ignorance has continually retarded the efforts of the health authorities to relieve conditions.

It might be said that the same ignorance has caused these people to neglect boiling their drinking water; in more than one instance a family had ceased to boil water after the recovery of its first case, only to produce a second outbreak in the same family.

Further Evidence

It is a striking fact that of the eleven cases on McCollum street, *all* had used water from the McCollum and Chestnut streets well or the "brewery spring." The same is almost true of Chestnut street cases, and is true for the several cases in Wakeman and Ann alleys.

While these two sources of water cannot be held responsible for all cases, yet they are undeniably a menace to the health of the immediate community — and in the light of the limited evidence at hand they stand out as the apparent factors in prolonging the outbreak of typhoid in Lockport.

Evidence in regard to ice and milk supplies was not, I believe, willfully withheld by those who for the most part furnished the information gladly. I believe they had not found out or made record of these supplies. No cases had been officially reported to the local board or health officer, and milk peddlers are not "registered" with the city.

The word of several local physicians in regard to these two items was: "Those who had ice got it from Savage, but hardly any two obtained milk from the same source."

ALBANY, N. Y., *February* 6, 1906.

Dr. J. N. BICKFORD, *Health Officer, Lockport, N. Y.:*

DEAR SIR:— I am enclosing you herewith a copy of the report of an examination of the local conditions attending the recent outbreak of typhoid fever in your city, made by Mr. Eric T. King, Inspecting Engineer on Water Supply, of this Department.

The facts revealed by the examination and report indicate a very serious and unsatisfactory condition of sanitary affairs in your city and call for the most stringent measures if a further spread of the disease is to be prevented.

Primarily, the causes which have led to the occurrence of typhoid to this unwarranted extent in your city are the absence of a proper public water supply and the natural pollution and infection of the sources of supply to which the citizens are thereby forced to resort. Even these causes, however, would have produced far less serious results than has been the case, had properly stringent sanitary measures been taken at the outset to prevent the spread of the disease. So far, however, from this having been done, it appears that since the time when the gradually increasing prevalence of the disease became sufficiently marked to warrant most serious apprehensions and remedies, no stringent and adequate measures have been enforced to stop the spread of the disease. The surroundings of the habitations in the infected district are uncleanly; no adequate measures have been taken either to improve the condition of the infected sources of private wafer supply nor to prevent their use by the citizens; the instructions and regulations for disinfection have not been adequately enforced; and, finally, the reports concerning the cases, which might otherwise furnish valuable assistance and suggestion as to the specific causes of the disease in each case, have not been made. It is not at all surprising, therefore, that the disease, after becoming well established in your city, has finally assumed a clearly epidemic form around one infection center.

In view of the existing serious conditions and the urgent necessity for radical measures to combat the disease and to prevent the spread of the disease in an epidemic degree to other districts

of the city, I can do no less than to recommend as an alternative to a stringent official order, the following essential steps and remedies to be employed and enforced by your board promptly, thoroughly and continuously until the disease shall have been broken up:

(1) That each source of private water supply known or strongly suspected to be infected be closed by order of your board of health. At the present time the pollution of a private water supply by sewage, cesspools or privies may, in the absence of adequate evidence to the contrary, be assumed as equivalent to typhoid infection, in those parts of the city where the disease has been prevalent.

(2) That all persons using water from sources which are not clearly above suspicion be strongly urged to boil all water used for potable purposes before using. The importance of this should be made as strong as possible and brought to the direct personal attention of each householder, not only through the public press, but by preparing and distributing printed placards or bulletins.

(3) That mandatory orders be enacted, issued and enforced regarding the proper disinfection of all typhoid dejecta. In order that the prescribed forms of disinfection may be made known to nurses and others charged with the care of patients, explicit and clear directions should be issued on the bulletin above referred to.

(4) That an order should be enacted by your board and issued to each physician practicing in Lockport, requiring each case of typhoid fever to be reported within six hours of the completion of a reasonably conclusive diagnosis.

(5) That an inspection and disinfection service be established by your board of health by which the premises where each case of typhoid has occurred shall be promptly examined, and the proper measures for scavengering and disinfection shall be instituted and maintained during the prevalence of the disease.

It is hardly necessary to remind you that after so long an occurrence of the disease as has occurred in Lockport, the greatest danger of a further spread of the disease lies in secondary infection of one case from another, without necessarily the intervention of the water supply as a factor of transmission.

You will kindly advise me promptly of the steps which shall be taken to meet the present situation, and especially to carry out the above directions, and in addition to this I shall be greatly obliged if you will report to me at least once each week, and as much oftener as you may consider it necessary, as to the progress of the disease and of the means taken to stamp it out.

Yours very truly,

EUGENE H. PORTER,

State Commissioner of Health

Whitehall

The Department was again called upon to investigate the occurrence of typhoid fever in the village of Whitehall, it having done so in 1904. As a result of the first investigation made by Dr. H. D. Pease, Director of the Antitoxin Laboratory, the source of the outbreak was believed to be the village water supply, but no near-by pollution of the same was found.

The outbreak which began in December, 1905, and continued to May, 1906, consisted of eighteen known cases, whereas the year previously there had been at least eighty-one cases.

The following is an abstract of Dr. Pease's report made June 29, 1906:

In response to the request of Dr. Wolcott I visited Whitehall, N. Y., on June 26th and 27th, in order to look into the continued occurrence of typhoid fever in that village.

In the winter of 1905 I made an investigation of the disease at that place, and concluded that the causation was the pollution of the Mettawee river, from which the village derives its water. No definite source of contamination was located, but the basis for believing that one or more existed was the almost exclusive existence of the disease in those parts of the village in which the village water was used, and its absence from those parts depending upon wells.

The disease first appeared in December, 1904, and reports of cases occurring, according to the following schedule, were received from the health officer, Dr. J. S. Guinan:

1905.— January 1–15th, 5 cases; 15th–31st, 24 cases; February, 23 cases; March, 14 cases; April, 9 cases; May, 6 cases; June, no cases; July, 1 case; August, 2 cases; September, 1 case; October, no cases; November, no cases; December, 2 cases.

1906.— January, 8 cases; February, 3 cases; March, 5 cases.

There have been a few cases since March, and on the whole there has been a smaller percentage of the cases actually occurring reported to Dr. Guinan and to us this year than last year, for there have been many more cases than have been reported.

The seasonal occurrence of the disease as shown above indicates the pollution of the water chiefly during the winter season. It is reasonable to suppose that the high water and the floods of this period bring about the pollution of the river through the washing of sewage into it from locations perhaps not directly on the banks of the river, or its branches, when the stream is at its normal level.

As Dr. Guinan informed me that typhoid fever was uncommon before three years ago, the source or sources of pollution are evidently of comparatively recent occurrence.

I would recommend that if possible some one be sent to Whitehall to trace up the river from the pumping station to beyond the villages which are located near its banks, and careful search be made for the possible sources of pollution; also that a drawing or plans of the stream be made with the location of possible sources of contamination indicated upon it, and that rules for the protection of the watershed be compiled and put in force.

Wellsville

In the months of October and November there occurred twenty-nine cases of typhoid fever in the village of Wellsville, and as the cause of this unusual outbreak was obscure the Department was requested to investigate the same.

Dr. H. D. Pease, Director of the State Hygienic Laboratory, was requested to proceed to Wellsville and investigate the epidemic, and later Mr. H. B. Cleveland, Assistant Sanitary Engineer, was sent to investigate the public water supply of the village.

The report of December 12th by Mr. Theodore Horton, Consulting Engineer of the Department, showing the facts obtained by Mr. Cleveland, gives a clear picture of the conditions surrounding the village water supply.

In regard to the quality of the public well supply of Wellsville, Allegany county, an application to this Department for an investigation of which was received from the secretary of the local board of health, J. B. King, November 21, 1906, I beg to report as follows:

The locality was visited by our Assistant Engineer, Mr. Cleveland, December 1, 1906, and on finding that the question of typhoid fever was being investigated and reported upon by Dr. Pease of this Department, his observations were, of course, limited to the location, pollution and other matters relating to the general quality of the water of these wells.

Wellsville is an incorporated village of about 4,350 population, situated on both sides of the Genesee river in the southerly portion of Allegany county.

The village has no public sewer system and but few private sewers.

The water supply is furnished by the Wellsville Water Company, and is derived from eight driven wells located, as shown by map submitted by local board of health, on the southwesterly bank of the Genesee river between the river and an old mill race. These wells are 30 feet deep and are driven through 8 feet of sandy loam, 4 feet of river gravel, 6 feet of clay and 12 feet of water-bearing gravel. Comparative elevations of ground surface and river are noted on map.

The Genesee river rises in Pennsylvania, about twenty miles southeasterly from Wellsville. The only places of any considerable population on the river above Wellsville are the following:

Shongo, N. Y., a small hamlet of 100 population, is located eight miles up stream. No houses or barns are located directly on the bank of the Genesee at this point and no sewers exist in the hamlet. Genesee, Pa., ten miles up stream, a railroad village,

has 600 or 800 population, and houses are built rather near the river. An oil refinery is located on the river one-half mile up stream from the wells and employs thirty people.

Opposite the site of the driven wells, South Brooklyn street runs parallel with and about 150 feet distant from the mill race mentioned above and has a private sewer leading to the northwest, discharging into the river one-half mile below the wells. Several houses on South Brooklyn street discharge sewage through private sewers into the mill race near the site of the wells. Also, several outside closets are located near the bank of race. Sewer connections from all these houses on South Brooklyn street might be made with the South Brooklyn street sewer and thus eliminate to a further degree the danger of pollution from the sewage now discharged into the mill race.

Water is pumped into the distributing system and the surplus during the winter months is stored in a storage and collecting reservoir connected by a main with the village system and located one mile south of the village in the hills. An inspection of this reservoir and its tributary drainage area was made. The reservoir seemed to be in sanitary condition except that cows had broken through boundary fence and manure was found near the banks. A storm-water by-pass channel is regulated so as to exclude storm water from the reservoir. On the watershed above the reservoir (which is formed by a dam spanning a narrow valley) four or five springs lead directly through barnyards and near outside closets, in one instance only three feet from a loosely constructed privy.

No water protection rules have been established to protect the supply in this reservoir, which collects surface water from three or four square miles of drainage area on which are situated several farmhouses on steep side hills.

We were informed that during the summer months the valve on the main leading from the storage reservoir to the village is closed. This valve was not opened this season until November 8th, and was left open until November 16th or 18th, and then closed to be reopened about December 1st. This valve is located about midway between the reservoir and the village. If this

valve is not perfectly tight, some water from the reservoir would be admitted to the distributing system in the village at all seasons.

Again, there is a direct inlet pipe with valve which admits water from the river to the pumping system, and the attendant at the pumping plant stated that when a fire in the village was of longer duration than two hours, river water was of necessity admitted to the system. We were informed by the attendant that such an emergency had not existed during the past season.

In view of the foregoing information, with respect to the location of the wells and their proximity to sources of sewage contamination and to features connected with the distribution system and the operation of the water works, I am of the opinion:

1. That in the absence of confirmatory chemical and bacteriological analyses, the water which reaches these wells is, from a sanitary standpoint, of a satisfactory quality, and could hardly be the cause of any alleged sickness in the village;

2. That any contamination which has occurred to the public water supply has not occurred at its source but comes from extraneous sources such as,

(a) Pollution upon the watershed of the temporary storage reservoir. This contamination would be effective principally while the reservoir was in use but might be effective at other times, due to possible leakage through the valve on the supply main between the reservoir and the village;

(b) Pollution from the contaminated water of the river, which is directly connected with the water supply system by an auxiliary intake. Although this river water is not intended to be drawn from except for fire purposes, the direct connection makes contamination possible through leakage or carelessness;

(c) Contamination through carelessness or ignorance in carrying out certain operations connected with the system — such as in the cleaning of the wells where, by the use of contaminated water or direct infection from the persons or tools used in the cleaning, infection of the supply could be caused.

I should, therefore, recommend that the attention of the authorities in charge of the water supply system and the secretary of the village board of health be called to:

1. The necessity of eliminating the pollution and consequent

danger of contamination from the watershed of the storage reservoir.

2. That precaution against other sources of contamination, such as may occur from the necessary operations of the water supply system, be carefully taken to preserve the purity of the water after it is taken from the ground.

The following is an abstract of the report of Dr. Pease, made December 3d, but the description of the sources of water supply is not included as it has been given in full by Mr. Horton:

It appears that there had been from the 18th of October up to the time of my visit twenty-nine cases of typhoid fever reported to Dr. Witter. These cases had developed in the village or in its immediate environment. Dr. Witter gave me a list of the twenty-nine cases which had been attended by six physicians. These cases lived in various parts of the village, and all but three used the village water. It is not only probable, but likely, that all drank village water at times.

The patients' ages were given as follows:

1 to 10, 9 cases; 10 to 20, 7 cases; 20 to 30, 6 cases; 30 to 40, 4 cases; over 40, 3 cases.

There was no possibility of a school infection in these cases. Moreover, they were not due to direct or indirect contact. All the cases occurring in the same house developed at the same time, or within a day or two of each other.

The time distribution of the cases is shown in the following table:

October 18, 1; 19, 0; 20, 1; 21, 0; 22, 0; 23, 0; 24, 0; 25, 0; 26, 0; 27, 0; 28, 0; 29, 0; 30, 0; 31, 0.

November 1, 2; 2, 2; 3, 2; 4, 2; 5, 0; 6, 0; 7, 0; 8, 8; 9, 0; 10, 2; 11, 1; 12, 1; 13, 0; 14, 1; 15, 3; 16, 0; 17, 1; 18, 2; 19, 0; 20, 0; 21, 0; 22, 0; 23, 0.

This table shows that after the two cases on the 18th and 20th of October there were no others until the first week in November,

in which there were eight cases. In the second week there were thirteen, and in the third week six.

The cases were in families taking milk from a number of different milk distributors, and milk infection can be ruled out.

There had been a street fair in Wellsville in September, but no relation between it and the onset of the disease could be traced.

A visit was made to the pumping station of the water company supplying the village with water, and the superintendent, Mr. Amsbury, placed at our disposal all the records, plans, etc., of the company relating to the plant, and he and his subordinates answered all questions, and gave all the information which was available.

The reservoir water is not used in the warmer months because of the growth of offensive algæ in it during that period. This reservoir water was not in use until November 8th according to the statements of Mr. Amsbury, and Drs. Witter and Coller. It was probably not concerned in the outbreaks of typhoid fever.

The other possible opportunity for the contamination of the village water consisted in the operation of cleaning the driven wells already referred to as the main source of supply. This was begun the last of September, and occupied about a month. One well was cleaned at a time. The operation for each consisted in closing the valve in the concrete pit and in opening up the elbow, and by pumping water down into the well and stirring up the fine sand which had accumulated, and repumping the water and sand to the surface.

While no pumping into the village supply was going on during the operation of cleaning a well, the fact that this cleaning began and continued just long enough prior to the outbreak to allow for the proper periods of incubation of the disease in those affected, and in the absence of any other known cause of the outbreak, it is not only possible, but very probable, that the village supply became contaminated during the time the wells were cleaned, and through the operation of cleaning.

The company should be required to notify the village authorities when any of the wells are to be cleaned, in order that these authorities may notify the inhabitants to boil the water during the cleaning period.

In my opinion the cause of the outbreak was due to the contamination of the village water supply by reason of the cleaning of the driven wells, furnishing the water, during the month of October.

Reynoldsville

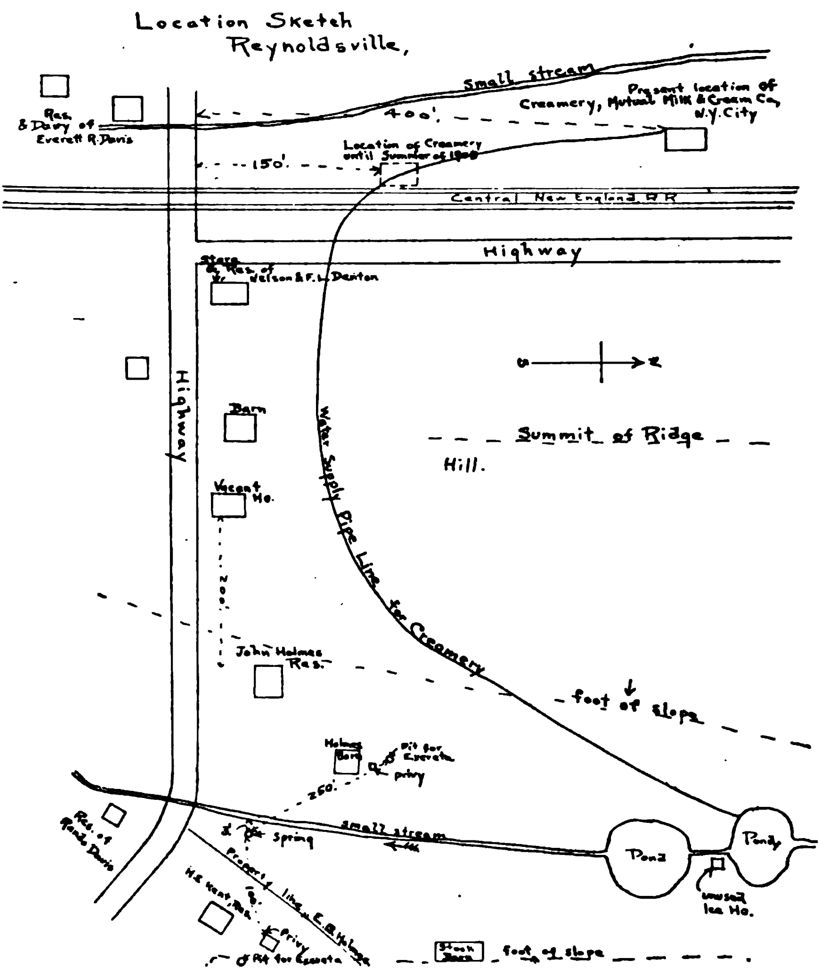
In February some of the citizens of Reynoldsville petitioned the Department to investigate the occurrence of typhoid fever in that village. This request was granted, and Mr. H. B. Cleveland, Assistant Sanitary Engineer, undertook the work under the direction of the Consulting Engineer, Prof. O. H. Landreth. The latter made the following summary of Mr. Cleveland's report:

Reynoldsville is a small unincorporated village or hamlet, situated in the town of Pawling, Dutchess county, on the Central New England railroad, where is situated the creamery of the Mutual Milk and Cream Company of New York. Mr. Cleveland's report contains a sketch map of the hamlet, showing the location of the creamery and of all the other points relevant to the inquiry.

The creamery in question, which does a business of shipping milk, secures its water supply for washing purposes from a small pond by means of a gravity pipe line.

On November 25, 1905, the foreman of the creamery, Mr. William Haxtum, who boarded at the residence of Mr. F. L. Denton, contracted typhoid fever. One week later Mr. Herbert E. Kent, an employee at the creamery, also contracted the fever. Mr. Kent's residence is shown near the extreme eastern part of the sketch map above referred to. On January 14th Mr. John Holmes, railroad station agent, contracted typhoid fever, and two weeks later his wife was also taken sick with the same disease. The Holmes' residence, as will be seen from the sketch, is situated less than 300 feet from the Kent residence, and both families take their water supply from a spring situated between the two, but nearer the Kent residence, from which it is distant less than 100 feet.

Mr. Cleveland's report shows that during the summer of 1905 a gang of Italian laborers engaged in double-tracking the Central


Location Sketch
Reynoldsville,
Small stream
Present location of Creamery, Mutual Milk & Cream Co, N.Y. City
Res. & Dairy of Everett R. Davis
400'.
Location of Creamery until Summer of 190
150'.
Central New England R R
Highway
Store & Res. of Nelson & F. L. Denton
Highway
Barn
Vacant Ho.
Water Supply Pipe Line for Creamery
Summit of Ridge
Hill.
John Holmes Res.
foot of slope
Holmes Barn
Pit for Excreta
privy
250'.
small stream
Spring
Res. of Rand Davis
Property line of E. B. Holmes
H. E. Kent, Res.
Privy
Pit for Excreta
Stock Barn
foot of slope
Pond
Pond
unused Ice Ho.

New England railroad were housed in box cars standing on the west track of the railroad, which was then a switch. One of the members of the gang was reported to have been taken ill with a fever and was at once removed, it is supposed, to St. Francis Hospital in New York. It was the practice of the Italian laborers to bathe and wash their clothes in the upper of the two ponds, from which water is supplied to the creamery by the pipe line.

All of the persons who contracted the fever were supplied with milk from the creamery. The Kent and Holmes families secured their water supply from the spring above mentioned, and Mr. Haxtum, who was the first to contract the disease, used water both from the creamery and from the well of Mr. F. L. Denton, with whom he boarded.

From the above facts, the details of which are more fully elaborated in Mr. Cleveland's report, it seems reasonable to infer, or at least to suspect —

That the creamery, late in November, became infected with typhoid fever, probably through the water supply from the pond, though possibly through some other cause connected with the change of location of the creamery during the past summer, made necessary by the broad gauging of the railroad;

That Mr. Haxtum and Mr. Kent contracted the fever directly from this cause;

That Mr. and Mrs. Holmes contracted the fever through their water supply from the spring being infected, either from the small stream which flows from the pond in question within three feet of the spring, or from infection originating at the Kent residence nearby.

Whether the foregoing assumptions are correct as to details, it seems quite clear that the cause of the outbreak was in some way associated directly with the creamery. If this was the case, it is impossible to tell how many other cases in New York city or elsewhere may have originated from this center. The use of water for creamery purposes from a pond exposed to such unwarranted and unchecked pollution as is shown in Mr. Cleveland's report, or the permitted abuse of a water supply for a creamery, appears little less than criminal negligence on the part of those responsible for the management of the creamery.

Fort Edward

Upon a complaint made to the Department that there had been many cases of typhoid fever in Fort Edward during 1905 and to June, 1906, Dr. H. D. Pease, Director of the Antitoxin Laboratory, was requested to investigate the same, who reported as follows:

A study of the reports made by the local health officers, Drs. W. B. Melick and O. H. Mott, upon the cases of typhoid fever in 1905 gave the following data:

A study of the cards showed that in 1905 there was a total of thirty-two cases reported to the Department. Of these, but seventeen were cases due to original sources of infection; that is, at least fifteen were caused by direct family contact with other cases.

Of the seventeen primary cases, in fourteen the source of the drinking water used prior to the attack was the Sandy Hill village supply. The other three claimed to have drunk well water only.

A study of fifteen cases out of seventeen, in which the date of infection could be determined, showed the following result as to this point:

February 8th–15th, 5 cases; 15th–22d, 2 cases; 22d–1st, 2 cases.

March 1st–8th, 0 cases; 8th–15th, 1 case; 15th–22d, 1 case.

October 1st–8th, 1 case; 8th– 15th, 0 cases; 15th–22d, 0 cases; 22d–29th, 1 case.

November 29th–December 5th, 1 case; December 5th–12th, 1 case.

This table indicates that there was a small collection of cases beginning in February and gradually decreasing to the last of March when the cases ceased. This mild epidemic was possibly due to a single short contamination of the Sandy Hill water supply.

The two October cases were attributed to wells, and the two November cases were said to be due to the Sandy Hill village supply. That any cases can occur through drinking the Sandy Hill water would indicate the possibility of its repeated pollution, and the system should be investigated, and the possible fault in it located.

Dr. Melick was out of town when I called. Dr. Mott stated

that a few cases of typhoid fever were occurring from time to time in the village, and that there were many cases of mild fever which could be investigated through the Widal test to advantage.

Gouverneur

A striking example of the danger of using unfiltered river water for the water supplies of cities, especially when the banks of such rivers are thickly inhabited, is to be found in the history of the typhoid outbreak at Gouverneur, N. Y., in the spring of 1906.

The following is an abstract of the report made by Mr. Eric T. King, Inspecting Engineer of the Department, on May 10, 1906:

Geography

Gouverneur is a village of about 5,000 inhabitants in the southwestern part of St. Lawrence county. It is built upon both sides of the Oswegatchie river, from which it takes its water supply unfiltered. The town also sewers into the river. For the most part, the dwellings are on high ground, some few people living upon made ground close to the river.

Sanitary Conditions

Speaking first of the village, it may be said to be a cleanly kept wholesome town; but there are several bad features about it. The sewerage system of the village has not kept pace with its growth, and there is only a part of the village sewered, including only the business or main streets and the very best residential section. Immediately adjoining this section is another residence section, which is drained by a natural water-course running to the Oswegatchie. Houses along both forks of this water-course sewer their houses by private drains or open ditches leading to the stream, which even at this season had not sufficient flow to flush itself or keep the house wastes moving. Along this stream have been several of the reported cases, and still there are people using wells within 50 or 100 feet of the stream, and

which penetrate far below its level. Sewerage of a proper kind is *imperative* for this district.

The Oswegatchie river is a rapid flowing stream which has its source in the Adirondack mountains. Upstream from Gouverneur for a distance of sixteen miles the valley is thickly settled and on its banks are five settlements, a hotel and an incorporated village. These all drain more or less directly into the river; there being in the village of Edwards two or three private sewers. At Talcville there is a row of privies built right over the water of the river. At South Edwards there has been considerable typhoid during the past year, but owing to the absence of the health officer in that town and the lack of time spent in investigation, I am unable to report specifically upon such cases outside the village of Gouverneur. At Hailsboro, three miles above Gouverneur, there have been four or five cases this spring. This evidence is given to justify my assertion that the raw water of the river, as taken by Gouverneur for a potable water supply, is unfit and unsafe to drink.

The Epidemic

There are "histories" of sixty-one cases of fever, nine of which came down in 1905, and three of which were outside the corporation limits of the village. The fifty-two cases for 1906 have occurred as follows: In January, 4; in February, 16; in March, 1; in April, 31. Thus it is apparent that there have been two practically distinct outbreaks. In the first outbreak, which occurred from two to four weeks after the first of two freshets in the river this year, fifteen out of the sixteen cases were consumers of the river water for drinking purposes. Only two cases obtained milk from a common source. I believe it is fairly conclusive evidence that the river water was directly responsible for the February outbreak.

The cause of the second (April) outbreak is not so directly traceable. The evidence previously submitted regarding soil conditions, lax supervision of disinfection, the open surface sewer, etc., must be admitted as a possible explanation for secondary infection in the cases who used well water for drinking. In this outbreak, nine cases out of thirty-one used river water, six used

spring water, and sixteen used water from several wells. Geographically, the cases were very evenly distributed over the village. Five cases used water from a spring near the railroad, in a hollow receiving drainage from the north and east, and within a hundred yards of two houses, where typhoid patients were treated during the February outbreak. This spring is in a private yard at Gordon street and the railroad. The milk supplied to the various cases came from very varied sources, and the source in many cases was unknown. There was another freshet in the river late in March, and the nine cases in April who had used river water *may* have derived the typhoid from that source directly.

There is a significant bit of evidence, which is difficult to trace, but which might be an explanation for the majority of the April cases. The St. Lawrence Farms Dairy, in the village of Gouverneur, has a new plant which is a model in design, and which is the most cleanly and faithfully kept plant of its kind which I have seen. However, their filter has not yet been installed, and raw river water has been used to wash their butter after churning. Hot water and dry steam is used in every other washing and cleansing process in the plant, but it is of course impossible with butter. Almost all the butter sold by retailers in Gouverneur is the output of this plant, and it would be entirely possible for infection to be carried from the river through the agency of this butter to those cases who were not consumers of river water for drinking purposes. Further in support of this theory is the fact that nine out of the thirty-one April cases are *known* to have drunk buttermilk from the St. Lawrence Farms Company.

I have then to repeat, that in my opinion the first outbreak of fever was directly caused by the drinking of the river water; and that the second was derived either by secondary infection, or by the combined agency of river water, butter and buttermilk.

ALBANY, *May* 11, 1906.

S. W. CLOSE, M. D., *Health Officer, Gouverneur, N. Y.:*

DEAR SIR:— I enclose you herewith copy of the report of Mr. King, Inspecting Engineer of this Department, upon his recent

investigation of the outbreak of typhoid fever in your village, and would request that you lay the matter before your village board of health.

The matter is of such importance, owing to the frequent cases of typhoid among those who use your village water supply, that this Department advises your local board of health to take immediate action to better existing conditions.

The Department would gladly co-operate with the local board, and render whatever assistance lies in its power.

Kindly advise me as to what action your board takes upon the recommendations made by Mr. King, the same having been approved by me.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

Kerhonkson

The following abstract of a report made by Medical Expert Dr. Louis B. Couch of Nyack is a fair example of the pollution of a public well as the probable cause of an outbreak of typhoid fever:

The village of Kerhonkson is built mainly on the side of a mountain of solid rock covered by a thin top soil of variable depth. Owing to its rocky nature only one or two wells exist throughout the whole place — such a thing as a drilled or driven well has never been seriously considered.

The inhabitants obtain their drinking water from a well on the property adjacent to and above the present school building, and known as the " Brown " well and from a clear spring at the bottom of the hill in the rear of the village store and known all over the region as the Loundsbury spring.

The school building is an old-fashioned two-story ramshackle affair with overhanging eaves especially designed to obstruct light and darken the upper schoolroom. The building is in the center of a pine grove 250 x 150 feet in size, which also obstructs the light and tends to dampen the building. At the extreme ends of this school lot are two privies for the boys and girls, built on loose stone foundations, innocent of mortar or cement, which allows the water in heavy storms to wash out the fecal contents of from

nearly a hundred pupils down upon the habitations below. Were there wells existing in the village as carelessly constructed as the Brown well and the various privy vaults which I have inspected the loss of life from typhoid fever would be terrible indeed.

On inquiry I learned that several cases of fever had broken out in families supplied with milk from a dairy of a farmer by the name of Link McConnell, whose nephew, Master Munson, had been stricken by the fever some time ago and had been ill with it for several weeks. This dairy seemed at first to be the probable source of infection, but further investigation showed that other families supplied from other dairies had also suffered from the same fever, which fact effectually disposed of the theory that any particular milk supply was the cause of the trouble, so this idea was abandoned as untenable.

Obtaining the names of all the patients who had suffered from this disease, I found that all but three were Kerhonkson public school pupils and all had drunk the water of the before-mentioned well on the Brown property. Two out of these three cases were mothers of pupils who had been stricken with the fever and who had nursed the children through their long and exhausting illnesses and afterward had been attacked by the disease themselves, while the third and remaining case was a puzzler. This boy had never been a pupil of the school in question, nor had he partaken of any of the water of the suspected well. He was a pupil of another school entirely and lived in an adjoining village a considerable distance away. A special visit to him however developed the fact that some time before his illness he had come to the village store in Kerhonkson to purchase goods and had *drunk water from the Loundsbury spring.*

It is interesting to note in this connection that at this very time the pupils of the Kerhonkson school were taking water from this Loundsbury spring, having been deprived of water privileges at the Brown well on account of criticisms and gossip entailed by the outbreak of the fever. It should be mentioned also that the pupils in obtaining this water had used the same old infected receptacles formerly used in taking water from the Brown well.

It is possible that in this way the above-mentioned lad contracted the disease.

As proof that the Brown spring has been the sole original source and cause of the trouble I submit the following:

Two years ago two cases died of typhoid fever on the property on which the Brown well is situated. Their stools were treated with lime and buried on the hill behind the house. Three cases of the same fever have occurred in the same house this season. The well in question is laid up with stone and cement and was supposed to be tight and impervious to surface water contamination. Investigation, however, proved that there were openings in the stone work in the side toward the privy. On examining the privy it was found that the foundation was composed of loose stones without cement or mortar that would readily allow the fecal contents to be washed down toward the well, the privy being about three feet higher than the well, the natural descent of the land being about one foot in twenty-five, the distance between privy and well being only about eighty feet. Another factor favoring the well contamination from this privy is that any filth washed downward from the privy toward the well would be stopped by the wall of the house proper and carried directly toward the well which lies close to the southeast corner of the house. Thus all of the conditions point to privy contamination of this well which should be at once cemented up on the inside, thoroughly cleansed and purified before its use should be permitted, while all the privies in question should be provided with vaults of brick eight inches thick with eight-inch brick floors all laid with cement, and their inside surfaces lined with cement at least one inch thick, to prevent any further possible contamination.

Corinth

Dr. F. C. Curtis of Albany, Medical Expert of the Department, made a report of his investigation of an outbreak of typhoid fever occurring at Corinth in the summer of 1906, and attributed the same to infected milk.

The following is an abstract of his report made September 25, 1906:

The facts regarding this outbreak are largely contained in the accompanying report containing data regarding each of the twenty-five cases of typhoid fever which have occurred during the present

year to the time of my visit there, September 14th, adding such further facts as were gathered by my observation.

It may first be said that the physicians of Corinth told me that typhoid fever is largely prevalent there every year. Exact information of the number of cases each year was not available and the State Department has not a record of them; the mortality from this cause in the published record does not exceed one or two deaths a year.

Two cases occurred in May last. Then about the 1st of July there was one case, followed in two weeks by another; and from then until the middle of August new cases developed in rapid succession, the bulk of the outbreak coming during the second week of August, in this time of practically simultaneous development there being twelve cases, the date of onset showing as many as three in one day. Then with an interval of a fortnight other cases appeared during about the first week in September; and a few more have come since my visit there. These cases were distributed throughout the village and its suburbs.

It is noteworthy that a considerable number of the subjects were young persons, suggesting origin from a school, but I found no reason to trace it here, and moreover the outbreak came during school vacation. Neither was there any common source of infection by food or otherwise at any other general gathering, nor by general distribution, with the exception of milk.

As concerns these nearly simultaneous cases, the characteristics of the outbreak are those of a milk-borne epidemic. Milk is supplied by four dairymen. About one-fifth is supplied from one dairy, that of Mr. Eggleston, the milk from which had been placed under suspicion by the health officer before my arrival. It will be noted that a large proportion of the families in which typhoid fever occurred took this milk. The amount of milk from it was 200 quarts. I attempted to secure a list of customers supplied, but it was refused.

A prolonged examination of the premises and methods of handling the milk showed sanitary conditions of fair average, with no present sickness in the family. A driven well, twenty-three feet through sand and then through eight inches of hard clay, forty feet from the house and remote from sources of organic pollution, yields water concerning which there can be no suspicion. There are two

privy vaults, one of which is shallow and open to the sides, about fifty feet from the house. Twenty cows are being milked; they are brought to the barn for this purpose, where milking is done in stalls of rude construction, ill-kept and uncleanly, but not beyond the average among farmers as to this. Milk is strained into the cans which are brought to the barn and left open till filled, at a point near the stables and the open barnyard. Washing the cans is done at the rear of the house, they being first rinsed with cold water, then scrubbed out with a brush and boraxine, after which they are scalded out with boiling water and laid on the side in the sun on a bench to dry from one o'clock till night.

Case No. 3 of the reported cases, onset July 4th, was that of a boy employed on this farm. He had been ailing for some days before the date given, which was that of his taking to bed, not long after which he went to his home and subsequently died of typhoid fever. His work had been about the barn and in care of the cows and milking them.

From the description of the procedure of caring for the milk cans and their exposure for hours in the sun, and also of the further exposure of the cans and their contents at the barn during the milking, it is manifest that they were open to access by flies. It was also possible for intestinal discharge, from this developing case of typhoid fever, deposited in the open privy vault fifty feet from the drying place for the cans or on the barnyard near by where cans were placed during the milking, to have been visited by flies which had not far to go to carry the infected material to them. The opportunity is such that it is a fair inference that the fulminant outbreak of August, which constituted the bulk of the epidemic, and mostly among the users of this milk, was developed through this medium, and that the infection of the milk occurred only for a limited period in July.

It is possible that the sequent cases had to some extent the same origin, some of the later ones being secondary cases to preceding cases in the same house.

Solvay

The following abstract of a report made by Dr. H. D. Pease, Director of the State Hygienic Laboratory, on October 27th,

gives the essential features and the possible causes of an outbreak of typhoid fever at Solvay:

From the statements of Dr. D. F. Mathews, health officer, and Messrs. Curtis and Schatle of the board of health, it appears that there were sporadic cases of this disease during the spring and early summer in their village.

About October 1st, five or six cases of the disease in persons living within a block and a half of each other were reported. From these a number of secondary cases have occurred, but there appears to be no indication of the appearance of any further cases due to the source from which the original cases were contracted.

What this source was cannot be stated with accuracy, but there is some circumstantial evidence that it was due to the contamination of the milk supplied by a certain dealer, Veeder by name, as all the patients but one obtained milk from him. His supply was purchased from three producers, named Hobbs, Hubbard and Hart. I visited the premises of the first and last-named persons, and found their facilities for producing and handling milk to be of the most unhygienic character, such as cow pens of the dirtiest kind and condition, and water supplies for cleaning cans of the most questionable sanitary character. However, I was unable to find evidence of illness of any sort existing in September in either the Hart or Hobbs families.

Dr. Mathews and Messrs. Curtis and Schatle stated that the conditions at Hubbard's farm were similar to those found by me at the Hart and Hobbs' premises.

The local board of health had had samples collected from the water supplies of all of these farms, and had then received the report upon that on the Hobbs' place, which showed it to be unfit for domestic use. The milk from the Hobbs' farm is not allowed to be sold in Solvay at present. The sale of milk from the other farms in question will also be prohibited by the local board if the water supplies are found to be unfit for domestic use.

The local board are most intelligent and active in the matter and have the situation well in hand.

There exists in Solvay, and I was informed that the same con-

ditions exist in adjacent parts of Syracuse, many outhouses on premises located on streets in which sewers exist. A few such outhouses were located in the region in which the typhoid fever outbreak occurred, and it is not beyond the field of possibilities that flies carried the typhoid bacilli from one of these to the homes of the persons stricken.

The village water supply has been found to be of excellent quality by frequent bacteriological examinations.

Castleton

One of the most instructive and interesting outbreaks of typhoid fever in 1906 occurred in the village of Castleton during the summer. The number of cases could not be determined, but in all probability was not less than twenty. The outbreak was investigated by Dr. H. D. Pease, Director of the State Hygienic Laboratory, on September 25th, and the following is an abstract of his report:

The first case occurred on the river side of the main street of the village in a man named Phifer. The details concerning this case are wanting, except that the patient and his family were of uncleanly habits. I was told that it was impossible to keep the Phifer house and premises in anything like a good sanitary condition.

As the village of Castleton, although thickly settled, has no sewerage system, the stools of this Phifer patient were supposed to be buried. Whether they were or not is open to question, but in all probability they were not. All of the cases, nine in number, which have developed since the death of Phifer, with but one exception, contracted the disease while living within one small block of the Phifer house, or directly from the localized cases. Most of the patients developed the disease while living in houses not over a hundred yards from the Phifer house.

In the case excepted from this group, I was unable to locate the method whereby he contracted the disease, but as he is a rough workman he might have become infected in any one of many ways.

It is doubtful if drinking water has played any special part in this group of cases. The village supply has been recently

examined and found in good condition. Well water is used to a considerable extent in the village, and undoubtedly many or most of these wells are polluted. However, the dwelling of the first case is located near the river, and somewhat lower than those of the other cases.

In every sick room I visited, there were considerable numbers of flies, many of which were disturbing the patients. The health officer stated that he warned those attending the sick to drive the flies out of the house. The health officer has always ordered the nurses to bury the discharges of the patients, but he is not sure that the orders have been followed. In the yard of one patient's house there were no evidences of disturbance of the sod for the burial of the stools, and if the stools had been buried in the yard, no worse place could have been selected, as a well, the water of which is used by many persons in that neighborhood, is located at the foot of the very steep bank upon which the entire yard is laid out. The discharges in all these cases have probably been thrown into the privy vaults, boxes, open untrapped closets leading into small private drains which run to the river, and into other similar places. These discharges were generally not disinfected, although the physicians have advised the use of some of the ready prepared and much advertised fluid disinfectants for washing out the vessels used in collecting the discharges.

To indicate the real value of these methods, I may state that in one house there have been four cases. The first case in the family contracted the disease in the infected region, and was brought to his home a mile distant. Later his two brothers contracted the disease and died, and I visited his mother who is now recovering from it. Flies were plentiful in the bed chamber of the mother, and there were general evidences of lack of cleanliness in the house. No other cases have occurred in that section. The nurse attending these patients assured me that the discharges were buried.

To summarize, it is my opinion that these cases were brought about by the carrying of the typhoid bacillus from the discharges of some of the patients to the food of the others by means of flies. This could not have occurred if the stools and urine of all the

early patients had been properly disinfected and then buried or thrown into proper drains.

MALARIA

That true malarial fever exists in some portions of the State, particularly the lower Hudson valley, has been maintained by some physicians for many years and has been doubted by others. Medical Expert Dr. F. C. Curtis was delegated in November to investigate an outbreak of several hundred cases of suspected malaria at Stony Point which had occurred during the summer. The following is his report, which verifies the diagnosis of true malarial fever made by the local physicians:

ALBANY, *November* 28, 1906.

The State Commissioner of Health:

SIR:— The health officer of the town of Stony Point, Rockland county, Dr. John Sengstacken, has reported to the Department the unusual prevalence of malarial fever. Going there yesterday to consult with him I make this report.

To describe the physical conditions first, there is an unincorporated village of Stony Point which, with a portion called Grassy Point, makes a scattered community of between two and three thousand people. Topographically there is an area along the banks of the river (Hudson) mostly level extending up and down the shore for a considerable distance, while one-eighth to one-fourth of a mile back the ground rises abruptly to a considerable height in broken hills. A moderate amount of the low area is overflowed occasionally by the tide, and meadow ground in the vicinity is rather marshy, of which there is an instance north a little distance from the railroad station. To the south a very tortuous and sluggish stream, but with fairly abrupt bank, meanders across the flats, being an arm from the river up which barges are brought. This stream further up in its course receives the waste from print works at Garnerville and gives off a faint acid odor without materially discoloring the water. Another much more rapid stream comes down through a break in the hill area.

The most conspicuous feature, however, to be mentioned is connected with the brick industry, which has been carried on here and at Haverstraw south of this place for many years. The soil here is made up of clay suitable for brickmaking, lying just beneath a surface alluvium. The latter is removed and the clay dug out. This results in excavations, some made years ago and left, others now in process of making. Consequently there are innumerable openings of several feet in depth and various areas from ten feet in diameter to several times this size. These basins thus formed in this impervious clay become filled with water by rain or seepage from the soil and never dry up entirely, since the clay holds the water just like sheet metal and the only loss is by evaporation. An illustration of this occurred in our investigation of the State Asylum for Crippled Children, located in this vicinity on high ground, where as a temporary expedient cesspools in the ground were found to fill rapidly and overflow without seeping away of the liquids. Throughout the low area between the river and the high ground, much of which has been or is being excavated for brick clay, there are many of these basins, all of which I found filled with stagnant water, probably in dry spells lowering to some extent, but most of them holding some water throughout the season, and never becoming entirely empty.

To the north of the village I was shown another body of water artificially constructed by a dam at either end, making a narrow winding pond partly filled by a little stream and springs, but so existing now that there is marshy ground about it and half-submerged land that evidently is subject to submergence and exposure, with vegetable growth covering it. There is some algæ growth naturally under such conditions on this somewhat stagnant collection of water; and I should mention that some of the brickyard holes have similar growth about them. This impounded water has no special use to which it is put. It is near a highway and also to the Stony Point State park.

Grassy Point is a part of the village which is built up in the flatland along the river and near the tortuous, sluggish creek and arm of the river referred to already, a considerable population living here and an old part of the community of the poorer class. Numerous excavated basins are in and about it. The better por-

tion of the community live along the high ground above, elevated perhaps 100 feet or more above the river. Here the houses are newer, of good surroundings and an ideal place with beautiful outlook on the river and Highlands is found. There is a considerable and growing population here and back of this to the north and south.

The history of the present outbreak is that it began in April last, that it increased in extent, reaching its height in August, since when it has subsided with at present no active primary cases. I saw only persons who had been ill during some earlier time. It prevailed over an area extending over the entire river front of the town, but not more than half a mile back from the river. Cases, and sometimes the entire family, occurred in the majority of the dwellings in this area. It was specially prevalent in the part known as Grassy Point.

The history of the cases is that of malarial fever in one form or another, some of tertian fever, but most of the æstivo-autumnal type. The fever yielded to quinine, was subject to recurrence and a few blood tests were made, not only here but on some that went to New York city, which showed the presence of the malarial organism. The sequellæ of acute malarial fever were conspicuously marked. No question exists as to the nature of the disease. There has been no case of typhoid fever among them.

Malarial fever has been prevalent in this locality for years past, though never to the extent that it has been this year. It exists not only at Stony Point but in Haverstraw and Cornwall to the north and doubtless at other points along the river.

Mosquitoes have been unusually abundant this year in that locality. They are the now recognized medium for the spread of malarial fever. It was noted that winds from the direction of the river brought clouds of them to the elevated territory of the village, followed by fresh cases of fever.

The remedy for this is to destroy their breeding places. This is a large undertaking since, as I have noted, ideal conditions for their propagation exist there in great abundance. Chief of these, I have no doubt, are the basins made by the brickyard excavations. How they can be done away with is a matter for study with each one. Some that I saw can easily be drained off. All

should be emptied and filled. I have no doubt that those making such excavations should be responsible for their removal. This can hardly be done at once, and meantime the destruction of the larvæ could be effected in the spring by use of crude oil and such means as Dr. A. H. Doty has used effectively on Staten Island.

Likewise the board of health should require that cisterns be covered, that tin cans and the like should not be thrown on the surface, that slop places should not be permitted on premises and all sink holes be filled. The winding pond referred to should either be emptied or filled with running water so that no half-submerged ground or stagnant pools exist. The remedy for the sluggish crooked stream is less apparent, but if it is a contributor to the propagation of mosquitoes I believe some betterment in its condition is possible. The first thing to be done, however, is to do away with the brickyard basins. Some one experienced in this kind of work should be employed to go over the ground and devise a plan for removing each one. The interests of the place are sufficient to warrant a considerable necessary attention to this matter, the remedy being, I am confident, attainable.

Very respectfully,

F. C. CURTIS, M.D.

DIVISION OF OPHTHALMOLOGY

DIVISION OF OPHTHALMOLOGY

BROOKLYN, *January* 12, 1907.

EUGENE H. PORTER, M. D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— The work of the division of ophthalmology has consisted in calling special attention to the physicians and school authorities of the State of the necessity for the annual examination of the eyes and ears of all the school children of the State. While this is already done in some of the larger cities it has not been taken up as yet by the many of the smaller cities and towns and not at all in the country districts where its necessity is as great if not greater than in the cities. This matter has been constantly brought to the attention of physicians for the last ten years by Dr. Allport, of Chicago, who has had the following resolutions passed by twenty-one State societies, by the American Medical Association, the American Public Health Association, State boards of health of twenty States and of the State boards of education of eight States:

Whereas, The value of perfect sight and hearing is not fully appreciated by educators and the neglect of the delicate organs of hearing and vision often leads to disease of these structures, be it therefore

Resolved, That it is the sense of the American Medical Association that measures be taken by boards of health, boards of education, school authorities and, where possible, legislation secured looking to the examination of the eyes and ears of all school children that disease in its incipiency may be discovered and corrected.

Three eastern States have passed laws requiring their State boards of health and education to see that the eyes of the school children are systematically examined and two of them also require

the examination of the ears and throat. These three States are Connecticut, Vermont and Massachusetts.

The plan found most effective is to have the examination made by each teacher of her class at the beginning of the fall term and whenever new scholars are added. The expense is very slight, not over $400 for 5,000 classrooms.

In several States this satisfactory examination of the eyes of the children is made without any legislation, merely by the combined action of the State boards of health and education. The plan requires that the teacher finding a defect shall report the matter to the father, mother or guardian of the child and to the principal and to the health officer of the town, so that the records of examination may be carefully kept by the Department. The correction of the trouble is entirely voluntary on the part of the parent who sends the child to such a competent person as the family physician may direct or the health officer of the town, if the parent chooses to consult him in preference.

It is hoped that very shortly some combined action may be taken by the Department of Health and Education to put this method into operation in the State of New York. I would recommend that some steps be taken toward securing appropriation to equip and meet the expenses of charts and blanks so a start on this plan might be made not later than the beginning of the next school year. Many of the institutions for feeble-minded are recruited by children with defective conditions. In a recent examination of 578 children with physical and mental defects, 419 or about 72 per cent. were found with defective eyes. A very large number of these were capable of being improved by proper glasses and treatment. In New York city in a group of 1,857 children, 70 per cent. suffered from some form of nervous disease largely brought about and increased by defective eyes.

In New York 98 per cent. of the truants are physically defective.

It has been found in Philadelphia that only a little over 11 per cent. of the children have perfect eyes.

Fraternally yours,

HERBERT D. SCHENCK, M.D.
Consulting Ophthalmologist

ANTITOXIN LABORATORY

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ANTITOXIN LABORATORY

Dr. Eugene H. Porter, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:— I have the honor to transmit herewith my report on the work carried on in the Antitoxin Laboratory during the year 1906, which completes the fifth full year of work of this Laboratory.

The work has been conducted in the same quarters as during the previous year, and as was stated in the last report these quarters can in no wise be considered as permanently suitable for work of this character. It is becoming increasingly more and more difficult to keep the stable in proper repair, and the construction of the laboratory building is of such a character that a comparatively insignificant fire might destroy the entire plant. Moreover, it is more expensive to conduct the work in such quarters than in a suitable fireproof building.

The addition to the building, during the months of August and September, for the purpose of giving space for the conduct of the State Hygienic Laboratory has permitted some rearrangement of the available space, and a part of the same has been utilized for the antitoxin production to its great advantage. In fact, certain work on the production of purified antitoxin could not be carried on were it not for these improved quarters.

Diphtheria Antitoxin

The number of places in the State which have had the benefit of the free distribution of antitoxin has not been greatly increased. Table I shows the growth of this distribution since the Laboratory began its work.

TABLE I

	1902.	1903.	1904.	1905.	1906.
Cities supplied	30	42	42	42	42
Villages supplied	161	204	617	691	793
Towns supplied	171	280			
Totals	362	527	659	733	835

It would seem as if the requirements of various portions of the State were satisfactorily met, as the demand from localities not previously supplied is not great. The health officers of some of the larger centers of population act as distributing agents to their nearby neighbors.

The total output of diphtheria antitoxin calculated on the basis of bottles of 1,500 units each was 17,794 bottles. This is an increase over that of last year as is shown in Table II.

TABLE II

Distribution of diphtheria antitoxin by years.

Nine months of 1902	6,552	bottles
1903	14,121	"
1904	16,374	"
1905	16,308	"
1906	17,794	"

TABLE III

Showing Potency of Serum Issued

1902, 300 units per cubic centimetre.
1903, 325 " " " "
1904, 375 " " " "
1905, 350 " " " "
1906, 350 " " " "

The entire increase and a large part of the distribution has taken place during the last three months of the year. Diphtheria was not particularly prevalent during the first eight or nine months and the demand was not as great as usual, but the great increase

in the incidence of the disease during the fall and winter accounts for the increased demand for antitoxin.

With the exception of an outbreak of the disease in the Gowanda State Hospital, no State institution suffered from more than a few cases of the disease, which were promptly isolated and treated with antitoxin, and an epidemic averted.

The superintendents of the following State institutions have thus controlled the few cases of diphtheria which have occurred in their institutions: State Reformatory at Elmira, State Hospital for Crippled and Deformed Children, Utica State Hospital.

The excellent results to be obtained from the State distribution of diphtheria antitoxin, are to be seen clearly from the following report of Dr. Daniel H. Arthur, superintendent of the Gowanda State Homeopathic Hospital:

GOWANDA, N. Y., *January* 6, 1907.

H. D. PEASE, M. D., *Antitoxin Laboratory, Albany, N. Y.*:

DEAR DOCTOR:—Your letter of the 11th inst., received, inquiring about our recent diphtheria epidemic, and in reply I send you the following account:

Our epidemic came out of an apparently clear sky, there never having been any cases in the hospital and, as far as we were able to ascertain through the board of health, there have been no cases in this vicinity for a considerable length of time.

On October 13th an attendant, in whose ward there were no sick cases, became ill with an ordinary cold. The following day he went away, returning the 15th, on which day he complained for the first time of sore throat, but on being examined showed only a congested condition. The next day (October 16th) examination showed a membrane on both tonsils. Culture and smear both showed diphtheria bacilli. Three thousand units of antitoxin were given and case immediately quarantined with a nurse. The next day, there being no improvement, 2,000 units of antitoxin were given.

On October 18th, patient No. 2, from same ward as Case No. 1, was observed having difficulty in swallowing and on examination a membrane was found on the right tonsil. Diphtheria bacilli

were found in smear and culture. Three thousand units of antitoxin were first given, and he received in all 10,500 units. Case No. 3, reported on October 18th, was the nurse to Case No. 1. Membrane was found on posterior pharyngeal wall extending to both tonsils. This patient received 4,000 units.

Case No. 4, October 20th, was a stenographer in the administration building who had a membrane on right tonsil and received 7,000 units of antitoxin.

Case No. 5, October 21st, was the first case who developed a membrane after immunization, he having received 500 units of antitoxin on October 19th.

After this, cases were reported daily and we began to immunize the patients in infected wards as soon as cases were discovered, using 600 to 700 units of New York State antitoxin. At the beginning of the epidemic we had a small quantity of Mulford's and P. D. & Co. antitoxin on hand which was used until the supply from Albany arrived. We immunized in all 898 patients. The cases at the commencement of the epidemic were the most severe. Cases Nos. 1, 2, 6 and 10 were very severe. Case No. 26, an old lady, received 10,000 units because the membrane, although slight, did not decrease as rapidly as it should and the temperature remained quite high.

We had sixteen cases in whose throats diphtheria bacilli were found, but no membrane developed. Fourteen of these cases had been previously immunized. In all these sixteen cases there were rise of temperature, marked prostration, with cardiac weakness and much irritation of pharynx. In all these cases diphtheria bacilli were found for a period of two weeks at least. In six cases a bacteriological diagnosis was first made, and all developed a membrane, five in two days and one in three days after diagnosis. Three of these cases had had immunizing doses; two had 600 units of antitoxin the day previous to diagnosis and the other 500 units of antitoxin four days previous.

Twelve cases were first diagnosed by clinical symptoms which were confirmed by bacteriological examination, all having membranes on tonsils, palate or posterior pharyngeal wall. There were no laryngeal or nasal cases.

Two cases had a membrane and all the clinical symptoms, but no diphtheria bacilli were found at any time. Both of these

cases received immunizing doses of 600 and 900 units of New York State antitoxin fourteen and five days respectively previous to diagnosis. The membranes in these cases were adherent to tonsils, leaving raw surfaces on being removed, the characteristic odor and all the clinical symptoms of diphtheria being present.

Cultures were made systematically in all patients in infected wards and those patients having streptococci were isolated in rooms and wards and cultures taken daily from nose and throat. Several of these showed the presence of diphtheria bacilli and were immediately sent to quarantine. As soon as diagnosis was made by either culture or clinical symptoms, cases received 5,000 to 6,000 units of antitoxin.

In view of frequent inspection of patients and of many cultures taken, we called the day when diagnosis was made the first day of the disease. If we found no improvement of a case on the third day, additional antitoxin was given, generally 2,500 units. Many of the cases showed so much improvement by temperature chart and local symptoms on the second and third days that no more antitoxin was given. The later cases we found were much more mild than those at first reported.

The last two cases we had developed a membrane on December 5th, one having been immunized November 8th and the other November 16th, each receiving 600 units of antitoxin and both of these cases were in wards that had had no previous cases.

In our opinion the antitoxin furnished by the State is very efficient and we believe in making the initial dose at least 5,000 units and continuing the antitoxin until the symptoms abate. We had no cases of abscess following injection and the reaction, which consisted of mild erythema, was present in twenty-seven cases following use of New York antitoxin. It was very interesting to note that in those cases which showed marked cardiac weakness they responded very readily to 1/120 gr. doses of strychnia.

Trusting that this account may be of some little interest to you, I remain,

Yours very truly,

D. H. ARTHUR,
Superintendent

A slight improvement is to be noted in the making of reports on the results obtained from the use of antitoxin on the part of physicians. They are far from complete, however. The anticipated improvement in the reporting of cases of diphtheria to the Department by the local health officers will aid materially in ascertaining those who fail to report the results of the use of our antitoxin.

From letters received from several physicians, it would appear that some of them at least are under the impression that reports of results are only desired from the severe and the fatal cases. If such is the case, then the death rates shown in the past reports of this laboratory are too high. It is not surprising that this state of affairs exists, for in order to report the result of the case in a patient who has recovered, the physician must delay sending his report for two weeks or longer in order to be able to state the fact of recovery, while in the cases ending in death the report can be sent in much earlier and while the information is fresh in the physician's mind.

Reports have been made upon the results obtained from the use of antitoxin in 3,692 persons. Of these, 1,431 were ill with diphtheria from the clinical or bacteriological standpoint or from both, and the treatment was intended for curative purposes, and fifty-two were ultimately found not to be diphtheria.

In the other 2,209 persons the injections were made for the purpose of preventing the disease.

Of the reports in the 1,431 sick persons twenty were incomplete in important particulars, and these are excluded from consideration in the tables that follow.

The use of antitoxin in the majority of the cases which proved upon bacteriological examination not to be diphtheria or which were shown clinically to be another disease, such as scarlet fever, indicates the growing tendency of physicians toward the early administration of antitoxin, even before a definite diagnosis can be made.

We shall consider the treatment of 1,411 persons because of the presentation in them of symptoms of diphtheria.

TABLE IV

Comparing Bacteriological and Clinical Diagnosis

A

BACTERIOLOGICAL DIAGNOSIS.	Number of cases.	Clinical Diagnosis.			Deaths.	Fatality.
		Positive.	Negative.	Not given.		
						Percent
Positive..........	519	463	5	51	44	8.4
Negative....	50	50	0	0	1	2.0
Not given or doubtful.......	842	796	0	46	89	10.5

B

CLINICAL DIAGNOSIS.	Number of cases.	Bacteriological Diagnosis.			Deaths.	Fatality.
		Positive.	Negative.	Not given.		
						Per cent
Positive..........	1,309	463	50	796	127	9.7
Negative.........	5	5	0	0	0	0.0
Not given or doubtful.......	97	51	0	46	7	7.2

Of these 134 ended in death, giving a mortality of 9.5 per cent. If we should eliminate from this number the forty-six cases with six deaths in which neither a bacteriological nor a clinical diagnosis was recorded, we would have 1,375 cases, all of which were diagnosed as diphtheria either clinically or bacteriologically, or by both methods, and of these 128 died, giving a mortality of 9.3 per cent.

These mortality percentages slightly exceed those recorded for the cases in the last three years, as is shown in Table V.

TABLE V

Showing Mortality Rates in Different Years

	1902.	1903.	1904.	1905.	1906.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Mortality in all cases treated..	8.3*	8.6	8.5	8.4	9.5
Mortality in cases either clinically or bacteriologically diphtheria...............	†	8.8	8.9	8.5	9.3

* A series of errors exist in the figures as given in the appendix of the Twenty-third Annual Report for 1902, page 909, beginning with line 14. The original manuscript read as follows: "These incomplete returns show that 482 cases of diphtheria were treated and over 3,000 additional well persons were protected from the disease by means of the State antitoxin. Of these 482 cases the reports were incomplete in that the final result was not stated in sixty-one and bacteriological examination showed that twenty-three more were not diphtheria.

Of the remaining 398 cases, a positive bacteriological diagnosis was not recorded in 244, although clinically all the cases were diphtheria. Of the 154 remaining cases three ended fatally, and of the 244 cases thirty did not recover. Two of the twenty-three cases shown not to be diphtheria also died."

Of the 398 cases there were therefore thirty-three deaths, a fatality of 8.3 per cent."

† Not estimated.

In considering the cases further the full number of 1,411 cases will be adhered to as there is apparently no essential variation in the mortality rates due to possible errors in diagnosis.

The great importance of giving antitoxin injections at the earliest possible moment in the course of the disease is most clearly shown in Table VI, which indicates the number of cases injected on each day of the disease with fatalities in each group.

TABLE VI

Showing Influence of Time of Injection of Antitoxin

Days of First Injection of Antitoxin

	First	Second.	Third.	Fourth.	Fifth and over.	Not stated.	Totals.
Cases	327	424	249	114	166	131	1,411
Deaths	12	30	27	13	30	22	134
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Fatality	3.6	7.1	10.0	11.4	18.	16.8	9.5

These results are not in entire harmony with those shown for the last three years, as can be seen in Table VII.

TABLE VII

Showing Mortalities in Cases Injected on Various Days of the Disease for Five Years

Days of Disease of First Injection

YEARS.	First.	Second.	Third.	Fourth.	Fifth. and over.	Not stated.	All cases.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
1902	3.2	6.6	9.4	21.2	20.0	1.6	8.3
1903	1.0	2.8	10.1	15.6	24.3	6.8	8.6
1904	.9	4.7	10.9	16.6	18.0	17.7	8.4
1905	2.3	5.0	5.1	18.1	21.	3.5	8.4
1906	3.6	7.1	10.0	11.4	18.	16.8	9.5

Undoubtedly the number of deaths which occurred in the cases injected on the first day of the disease is not correctly indicated in Tables VI and VII, for the reason that an unusual number of physicians recorded as the first day of the disease the day on

which they were called to see the patient. Except in cases of accidents, other complicating diseases, in very young or unusually frail children, and when very small doses of antitoxin are given, it is most uncommon to note a fatal termination in a patient injected on the first day of the disease.

In Table VIII are recorded the total doses of various sizes administered, and the number of patients receiving each, together with the number of deaths in each group.

It is of interest to note that approximately 85 per cent. of the patients received 3,000 units or over, 33 per cent. received over 5,000 units and that 10 per cent. received over 10,000 units.

TABLE VIII

Showing Total Dosage in Each Case

SIZE OF DOSES.	Number of cases.	Deaths.
Unknown	15	2
Up to and including 1,500 units	146	4
1,500 to 2,500 units	54	2
2,500 to 3,000 units	556	38
3,000 to 5,000 units	168	12
5,000 to 6,000 units	186	24
6,000 to 8,000 units	60	9
8,000 to 10,000 units	74	10
10,000 to 20,000 units	120	24
Over 20,000 units	32	9
	1,411	134

While the table shows that among the patients receiving the larger doses the death rate is higher, this is undoubtedly due to the fact that the larger doses are most generally used when the patient has shown the most serious symptoms, and by the time this state has set in the delay in treatment has brought about the conditions demonstrated in Table VI. Thus it can be said that even large injections of antitoxin begun late in the course of the disease will not in all cases make up for the delay in the treatment.

In accordance with the recommendations made in the report for 1904, the distribution of the 2,500-unit packages was discontinued and a 3,000-unit size substituted. That this was not done too soon is shown by the increased use of the larger package.

For demonstrating the 134 fatal cases the arrangement of last

year will be adhered to, namely, their presentation in groups as follows:

First, containing those cases moribund when first injected with antitoxin;

Second, containing those cases not injected until the third day or later;

Third, containing those cases dying from heart failure;

Fourth, containing those cases in which a serious complication contributed to the fatal termination;

Fifth, containing the fatal cases in children under two years of age;

Sixth, containing the remaining cases, in which sufficient accurate information for classification was not available.

Group one contains fifty-seven cases moribund when injected with antitoxin. In only fifteen of these cases did the physician record the day of the injection as before the third.

Group two contains twenty-two cases not injected until the third day of the disease or later. However, forty-one cases in group one of moribund patients, ten cases placed in group three or heart failure cases, seven cases placed in group four on account of serious complicating diseases were also first injected on the third day or later. Thus eighty out of the 134 fatal cases were injected later than the second day of the disease.

Group three contains twenty-four cases which terminated fatally from heart or circulatory complications, either acutely or during convalescence from some sudden strain put upon the heart. In only twelve of these cases did the physician's record claim that the first dose of antitoxin was given on the second day. All but three of these patients died during convalescence from a sudden strain on the heart, and six received but 3,000 units of antitoxin. As was stated last year, a detailed examination of the records of these cases of heart complications shows a close connection between their occurrence and delayed antitoxin treatment.

Group four contains fourteen cases in which, in addition to diphtheria, the patients had serious complicating diseases, such as scarlet fever in two cases, nephritis in four cases, pneumonia in four cases, and erysipelas, septicæmia and alcoholic poisoning in one case each. The five cases of pneumonia (probably broncho-pneumonia) were injected on the third day or later.

Group five contains six cases occurring in infants of two years or under. Nine cases in group one of moribund patients were also in infants of two years or under.

Group six contains nine cases in which the reports were so incomplete, or apparently contradictory, that they cannot be grouped.

The above figures are of considerable significance in that they strongly indicate that barring complicating diseases, and with care during convalescence, every patient over two years of age should recover from diphtheria, providing a large dose of antitoxin is administered on the first or at the latest the second day of the disease.

As has been mentioned above, reports on the use of the Department's antitoxin in 2,209 well persons have been received. This is unquestionably but a small proportion of those receiving such doses. In past years the number has been much larger owing to the extensive immunizations in State hospitals and institutions at the onset of threatening epidemics, but these have not occurred during the last two years. On the other hand, there has been an increase in the private physicians' reports of the use of antitoxin for this purpose.

Of the 2,209 persons immunized, fifteen developed diphtheria within a period of one month from the date of injection. All of these cases were mild and recovered rapidly.

Tetanus Antitoxin

The distribution of tetanus antitoxin has been somewhat in excess of the last two years. It consisted of an amount equivalent to 4,162 bottles of ten cubic centimetres each. This was divided into 603 doses of fifty cubic centimetres each and 1,147 doses of ten cubic centimetres each.

Facts are not available which will show the number of cases of tetanus which have occurred during the year, but it is quite probable that there were more than usual. Our attention, at least, has been called to the disease somewhat more than last year, and reports upon the use of our antitoxin in twenty-two cases have been received. However, the number which occurred owing to Fourth of July accidents has certainly decreased. Only four of the

twenty-two cases reported upon were due to Fourth of July injuries. A large part of this decline in the incidence of the disease at this time of year is due to the use of prophylactic injections of tetanus antitoxin in the treatment of such injuries.

Of the 123 reports which have been made upon the use of prophylactic doses of State tetanus antitoxin for the prevention of tetanus, fifty-nine, or nearly 50 per cent., were cases in which injuries were due to Fourth of July accidents. Thus, although 20 per cent. of the cases of tetanus treated with tetanus antitoxin were due to Fourth of July injuries, 50 per cent. of the prophylactic doses of antitoxin were used on persons injured through excessive or foolhardy patriotism.

While the medical profession and the public have begun to learn that Fourth of July injuries carry with them great danger of tetanus, they have yet to fully realize that injuries other than these are frequently followed by lockjaw, and that in the treatment of such injuries tetanus antitoxin administered subcutaneously in small prophylactic or immunizing doses is a sure preventive agent.

Although twice the number received in 1905, the number of reports returned in 1906 (123) is, however, no indication of the large number of injections of State antitoxin which are being administered for the prevention of the disease in injured persons in all parts of the State. The efforts of this Department looking toward the prevention of this disease in toto are bearing some fruit.

To this end the director of the laboratory associated himself with Dr. Nathan Jacobson, of Syracuse, and presented to the American Surgical Association at its last meeting at Cleveland, Ohio, an elaborate paper on the subject of tetanus and its serum treatment, and included in it most of the cases which had been reported to this Department as having been treated with State tetanus antitoxin. As the preparation of this paper required a very considerable amount of labor on the part of both Dr. Jacobson and the director of the laboratory, and as there developed some difficulty in publishing the tables in an appropriate manner, and in order that the results indicated in it may have the widest publicity in this State, I am including this paper as part of an appendix to this report.

SPECIAL WORK

Tetanus Antitoxic Unit

References were made in the annual reports of the laboratory for the years 1902, 1904, 1905, to efforts which were being made in this laboratory, as well as in other American laboratories, to formulate and establish a method for the standardization of tetanus antitoxin, so that those using this serum would know the amount of the effective antitoxic principle which they were administering in a given bulk of serum.

When the production of tetanus antitoxin was started in this laboratory, there existed no satisfactory or customary method of testing the antitoxic strength of this serum, and much time was spent by me during the first year of the laboratory's existence in hunting up the literature of the subject and in endeavoring to formulate a satisfactory test which would be harmonious with those in use in other laboratories.

Theobald Smith,* in 1898, had discussed the subject and had criticised the unit used by Lambert as not being in harmony with that used in Germany. He states, however, that the facts concerning the German unit had never been clearly stated, and he there gave as satisfactory a statement of the German unit as was possible to make.

Two papers on the subject were published by Behring† after the appearance of Dr. Smith's article, and from these it was possible to gather the fact that the German test then in use depended almost entirely upon the strength of a particular toxin (Behring's Number V). In fact, this toxin was sent out to the official testers of tetanus antitoxin with a given dose as the standard. The fact that the method of making the test described by Behring in the first paper was radically altered before the publication of the second article indicated clearly that unsatisfactory conditions existed. Moreover, a written request for an opportunity to purchase some of the standard toxin used by Behring brought in reply a polite note of acknowledgment of the request but no toxin.

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*Theobald Smith. Boston Medical and Surgical Journal. 1898, March 31st.
† Behring. Deutsche Med. Wochen. 1900, January 11, S. 30.
Behring. Deutsche Med. Wochen. 1903, August 27, S. 619.

In the meantime, the tetanus antitoxins issued from this laboratory were tested on guinea pigs by estimating the amount of antitoxic serum required to prevent any symptoms of tetanus when the same was mixed with the smallest amount of tetanus toxin which would certainly kill a medium-sized guinea pig in four days. Serums of which from 1/10,000 to 1/50,000 of a cubic centimetre would protect guinea pigs from certainly fatal doses of tetanus poisons were sent out in doses of ten and fifty cubic centimetres each.

In March, 1903, a new method of testing the serums was formulated. The Behring-Knorr test as described by Theobald Smith, and in which guinea pigs in place of mice were used as the test animal, was used as the basis for the method.

Smith states, " The unit as settled upon by Behring and Knorr is quite different from that of the diphtheria unit. One-tenth of a cubic centimetre of the normal serum, instead of neutralizing ten fatal doses of toxin as in diphtheria, is expected to neutralize for 250 gram guinea pigs about 100,000 minimum fatal doses; for white mice 300,000."

If one cubic centremetre of normal serum was taken as the Behring-Knorr unit, then it was assumed as a basis for our test that 100 minimum fatal doses would be neutralized by 1/10,000 of an antitoxic unit. In other words, the test which was then formulated for this laboratory was that a unit of tetanus antitoxin would be contained in 10,000 times the amount of antitoxic serum, which would completely neutralize 100 minimum fatal doses of tetanus toxin for guinea pigs weighing 300–400 grams when the toxin and the antitoxin were injected together after being thoroughly mixed. Table IX gives the results of such a test of antitoxin 4242a.

TABLE IX

Guinea pig No.	Weight.	Date.	Tox.	Dose.	Toxin Dilutions. A	Toxin Dilutions. B	Injected.	Serum.	Dose.	Dilutions. A	Dilutions. B	Injected.	Results. Death.	Results. Days.	Results. Hrs.	Symptoms.
3304....	325	Jan. 24, 1906	282	.0001	1+99	1+49	.5	......	......	......	......	......	+	3	......	
3300....	327	Jan. 24, 1906	282	.0001	1+99	1+49	.5	......	......	......	......	......	+	4	......	
3301....	328	Jan. 24, 1906	282	.00015	1+99	1+49	.75	......	......	......	......	......	+	4	......	
3303....	330	Jan. 24, 1906	282	.00015	1+99	1+49	.75	......	......	......	......	......	+	4	......	
3307....	335	Jan. 24, 1906	282	.0002	1+99	1+49	.1	......	......	......	......	......	+	2+	......	
3305....	342	Jan. 24, 1906	282	.0002	1+99	1+49	.1	......	......	......	......	......	+	3	......	
3302....	345	Jan. 24, 1906	282	.00025	1+99	1+49	1.25	......	......	......	......	......	+	2+	......	
3308....	350	Jan. 24, 1906	282	.00025	1+99	1+49	1.25	......	......	......	......	......	+	2+	......	
3309....	355	Jan. 24, 1906	282	.0003	1+99	1+49	1.5	......	......	......	......	......	+	3	......	
3306....	364	Jan. 24, 1906	282	.0003	1+99	1+49	1.5	......	......	......	......	......	+	2	......	
3311....	365	Jan. 24, 1906	282	.0004	1+99	1+49	2.	......	......	......	......	......	+	1-2	......	
3310....	385	Jan. 24, 1906	282	.0004	1+99	1+49	2.	......	......	......	......	......	+	2+	......	
3413....	320	Feb. 13, 1906	282	.0001	1+99	1+99	1.	......	......	......	......	......	+	7	......	
3417....	342	Feb. 13, 1906	282	.00015	1+99	1+99	1.5	......	......	......	......	......	+	4	......	
3416....	345	Feb. 13, 1906	282	.00015	1+99	1+99	1.5	......	......	......	......	......	+	4	......	
3410....	325	Feb. 13, 1906	282	.0002	1+99	1+99	2.	......	......	......	......	......	+	3	......	
3052....	325	Feb. 13, 1906	282	.0002	1+99	1+99	2.	......	......	......	......	......	+	3	......	
3216....	362	Feb. 13, 1906	282	.015	1+99	......	1.5	4242A	1-10000	1+99	1+99	1. cc.	......	......	......	Symptoms 6th day.
3072....	360	Feb. 13, 1906	282	.015	1+99	......	1.5	4242A	1-7500	1+249	1+29	1.	......	......	......	No symptoms.
3043....	387	Feb. 13, 1906	282	.015	1+99	......	1.5	4242A	1-5000	1+99	1+49	1.	......	......	......	No symptoms.
3415....	375	Feb. 13, 1906	282	.02	1+99	......	2.	4242A	1-10000	1+99	1+99	1.	+	4	......	
3411....	390	Feb. 13, 1906	282	.02	1+99	......	2.	4242A	1-7500	1+249	1+29	1.	......	......	......	Slight symptoms.
3408....	370	Feb. 13, 1906	282	.02	1+99	......	2.	4242A	1-5000	1+99	1+49	1.	......	......	......	No symptoms.

The serums issued from this laboratory after October 1, 1903, were tested according to this method. During the next two years serums containing from .5 to .75 unit per cubic centimetre according to this test were issued in doses of ten and fifty cubic centimetres, or from .5 to 7.5 units in the former sized dose to 25 to 375 units in the latter sized bottle. As a general rule, the weaker serums were issued in the smaller doses intended for immunizing purposes.

Attempts were made to compare the strength of the tetanus antitoxins sold in Germany with those prepared in this laboratory, but the results were such that no satisfactory comparison of the German test with ours could be drawn and the details will not be given.

At the meeting of the Society of American Bacteriologists held at Ann Arbor, Mich., December, 1905, a committee was appointed to consider the standardization of tetanus antitoxin and report at the next meeting.

The committee was constituted as follows: Dr. J. J. Kingoun, Glenolden, Pa., Chairman; Drs. W. H. Park, New York city; M. J. Rosenau, Washington, D. C.; Joseph McFarland, Philadelphia, Pa.; E. M. Houghton, Detroit, Mich., and H. D. Pease, Albany, N. Y.

This committee organized in New York city, February 24, 1906, and decided to accept the offer of Dr. Rosenau of the United States Public Health and Marine Hospital Service, to supply the various members of the committee with a precipitated tetanus toxin which could be tested by each member according to a given method which was outlined at the meeting. The unit of antitoxin was tentatively considered to be the least amount of serum necessary to save the life of a 350 gram guinea pig for four full days against 100 minimal lethal doses of toxin for pigs of the same size.

Tests of the toxin submitted by Dr. Rosenau were made in this laboratory and the toxin utilized as above, for testing the antitoxic strength of the tetanus antitoxic serum 4242a, the test results of which by our own method of testing are given in Table IX.

TABLE X

Guinea pig No.	Weight.	Date.	Tox.	Dose.	Toxin Dilutions. A	Toxin Dilutions. B	Injected.	Serum.	Dose.	Dilutions. A	Dilutions. B	Injected.	Results. Death.	Results. Days.	Results. Hrs.	Tetanic symptoms.
3629....	300	April 6, 1906	A	.000004	.0269 gm.+26.9 cc.	1 cc.+99	.4 cc.	....	....	....	....	....	+	2	16±	
3623....	305	April 6, 1906	A	.000004	.0269 gm.+26.9 cc.	1 cc.+99	.4 cc.	....	....	....	....	....	+	2	16±	
3627....	307	April 6, 1906	A	.000005	.0269 gm.+26.9 cc.	1 cc.+99	.5 cc.	....	....	....	....	....	+	2	20	
3628....	307	April 6, 1906	A	.000005	.0269 gm.+26.9 cc.	1 cc.+99	.5 cc.	....	....	....	....	....	+	2	16±	
3634....	307	April 6, 1906	A	.000006	.0269 gm.+26.9 cc.	1 cc.+99	.6 cc.	....	....	....	....	....	+	2	20	
3632....	302	April 6, 1906	A	.000006	.0269 gm.+26.9 cc.	1 cc.+99	.6 cc.	....	....	....	....	....	+	3	......	
3635....	325	April 6, 1906	A	.000007	.0269 gm.+26.9 cc.	1 cc.+99	.7 cc.	....	....	....	....	....	+	2	16	
3604....	325	April 6, 1906	A	.0006	.0269 gm.+26.9 cc.	1 cc.+99	.6 cc.	4242A	1-11000	1+199	1+54	1 cc.	+	2	......	
3631....	350	April 6, 1906	A	.0006	.0269 gm.+26.9 cc.	1 cc.+99	.6 cc.	4242A	1-10000	1+199	1+49	1 cc.	+	4+	......	
3630....	330	April 6, 1906	A	.0006	.0269 gm.+26.9 cc.	1 cc.+99	.6 cc.	4242A	1-9000	1+199	1+44	1 cc.	+	2	......	
3633....	350	April 6, 1906	A	.0006	.0269 gm.+26.9 cc.	1 cc.+99	.6 cc.	4242A	1-8000	1+199	1+39	1 cc.	....	....	......	Severe symp'oms.

Comparing these with the results of the committee's method tests, using the Rosenau toxin, as shown in Table X, it will be noticed that the results are quite similar although not identical. The committee test is more severe, but the end reaction is not the prevention of the evidences of tetanus as in our test, but is the prevention of death of the animal before the fourth day.

The committee's test is therefore fundamentally the same as that already used in this laboratory, but the method of expression of the results is different, for the tentative committee unit is 100 times weaker than ours; that is the serums we have put out as containing one-half to three-quarters of a unit would contain fifty to seventy-five tentative committee units.

At the final meeting of the committee held in New York, December 26, 1906, it was decided to modify the tentative unit and it was accordingly adopted as follows: "The unit is ten times the least amount of serum necessary to save the life of a 350 gram guinea pig for ninety-six hours against the official test dose of the standard toxin. The test dose is 100 minimal lethal doses of a precipitated toxin preserved under special conditions at the Hygienic Laboratory of the Public Health and Marine Hospital Service."

This action made the unit ten times weaker and therefore the serums issued by us as containing one-half to three-quarters of a unit would contain 500 to 750 units per cubic centimetre.

Actual retests of our serums give further evidence of this similarity between the tests in use in this laboratory for two years and that of the committee. This laboratory has however changed its method of expressing the unit to conform to the committee's action. It was finally agreed by the committee that 1,500 of the official units of tetanus antitoxin should be distributed after April 1, 1907, as an immunizing dose of antitoxin.

This laboratory has sent out vials containing 10 cc. of about a 300-unit serum for the last two years which would give a dose of 3,000 official units, but the doses sent out after April 1, 1907, should be 1,500 units. It is recommended for the sake of convenience that the therapeutic doses to be distributed be 10,000 units.

The settlement of this question of the standard for tetanus antitoxin is a matter of congratulation and it is gratifying that the new standard is so closely and fundamentally similar to the one previously used by us.

Effect of Injections of Bacterial Toxins on Horses

Since the first year of the work of this laboratory, data relating to the effect of injections of the diphtheria, tetanus and other toxins have been accumulated. During the past two years fairly complete autopsies and studies have been made on the horses dying from the effects of the treatment given them for the production of antitoxins.

In this work Dr. Richard M. Pearce, director of the Bender Hygienic Laboratory, and staff have participated. The results of the studies were compiled and presented by the director of the laboratory and Dr. Pearce, at the sixth annual meeting of the American Association of Pathologists and Bacteriologists, held at Baltimore, May 18, 1906, and the completed paper was published in the Journal of Infectious Diseases, 1906, Volume III, pp. 619–637.

As this paper represents much labor on the part of the staff, it is herewith submitted for publication in the appendix.

Purified and Concentrated Antitoxins

As has been mentioned in previous reports, the director of the laboratory has made such studies in this field as his other duties permitted, and during the months of March, April, May and June special efforts were made by him to obtain a practical method of obtaining the antitoxic globulins freed from the unessential globulins and albumens of the serum. However, no results of immediate practical value were obtained. When Gibson published his work on this subject efforts were made to duplicate his results but without uniform success. After several experiments directed at solving the difficulty were made it was found that Gibson's statement that the pseudo-globulin in the mixture of pseudo and euglobulins and other similar substances precipitated from antitoxic horse serum by a half-saturated solution of ammonium sulphate could be separated from those unessential globulins, etc.,

by solution in saturated sodium chloride solution, was not strictly correct. Gibson did not work with dried globuline precipitates of the mixed globulins, and the half-saturated ammonium sulphate solution in his mixtures diluted the saturated sodium chloride solution and enabled it to dissolve the pseudo-globulins containing the antitoxins which it would not do if fully concentrated.

This subject is still under investigation in the laboratory and it is expected that the investigations made more recently will permit of publication. A large amount of the purified and concentrated antitoxin was prepared by the modified Gibson method and was distributed in the usual way, and no complaints have been received showing its use to be in any way less satisfactory than that of the raw serum. On the other hand, Park has shown it to possess decided advantages in the way of eliminating about one-half of the skin disturbances which follow the use of the unpurified horse serum.

Educational Work

Much has been done during the year to disseminate the facts known to the laboratory staff to the medical profession particularly throughout the State.

The following papers were prepared and presented as indicated:

The Prevention and Treatment of Tetanus. By Herbert D. Pease. Presented at the meetings of the following societies:

City Medical Association, Auburn, N. Y., June 21, 1906.

Tompkins County Medical Society, Ithaca, N. Y., October 16, 1906.

Toronto Pathological Society, Toronto, Ontario, Tuesday, November 27, 1906.

Liver Necrosis and Venous Thrombosis in Horses Actively Immunized with Diphtheria and Tetanus Toxins and with Streptococci and Their Products. By Herbert D. Pease and Richard M. Pearce. Read before the Sixth Annual Meeting of the American Association of Pathologists and Bacteriologists, Baltimore, May 18, 1906. Published in the Journal of Infectious Diseases, Vol. III, pages 619–637, 1906.

The Serum Therapy of Tetanus. By Nathan Jacobson, M. D., of Syracuse, N. Y., and Herbert D. Pease. Read before the

American Surgical Association, Cleveland, June 1, 1906. Published in the Annals of Surgery, September, 1906.

Some Features and Results of the Treatment and Prevention of Diphtheria by the Use of Antitoxin. By Herbert D. Pease. Presented at the meeting of the Medical Society of Troy and Vicinity, January 9th, and the Albany County Medical Society, January 10th. Published in the New York State Journal of Medicine, May, 1906.

The Laboratory in Public Health Work. By Herbert D. Pease. Presented at the Annual Meeting of the Homeopathic Society of the State of New York, Albany, February, 1906. Published in the North American Journal of Homeopathy, May, 1906.

The Transmission and Prevention of Typhoid Fever. By Herbert D. Pease. Presented at the Herkimer County Medical Society, at Little Falls, N. Y., Tuesday, September 4th.

The Etiology and Prevention of Typhoid Fever. By Eugene H. Porter and Herbert D. Pease. Presented at the International Congress of Homeopathy, section of Hygiene and Sanitary Science, held at Atlantic City, September 14, 1906. Published in the Transactions of the Congress.

Vaccine and Vaccination. By Herbert D. Pease. Presented to the State Sanitary Institute, Albany, December 19, 1906.

In addition to the preparation and presentation of these papers, the director has taken an active part in the preparation for and conduct of the Conference of Sanitary Officers, held at Syracuse, N. Y., October 24th, 25th and 26th, and particularly in the collections and demonstration of the tuberculosis exhibition given at that time. He has also taken an active part in the work of the State Sanitary Institute, which held its opening session in the Bender Hygienic Laboratory on December 18 and 19, 1906.

Respectfully submitted,

HERBERT D. PEASE,

February 1, 1907. *Director Antitoxin Laboratory*

APPENDIX ANTITOXIN LABORATORY

THE SERUM THERAPY OF TETANUS*

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AND

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DIRECTOR OF THE ANTITOXIN LABORATORY, NEW YORK STATE DEPARTMENT OF HEALTH.

As the title of this paper indicates, its scope is restricted to a consideration of the therapeutic value of the antitoxin treatment of tetanus. However, it is essential in order to obtain a just estimate of the value of the antitoxic serum that we appreciate certain principles which laboratory investigation seems to have firmly established, and that we study carefully our clinical experiences.

The Tetanus Bacillus. Tetanus is essentially a dirt disease. Its etiologic agent, the tetanus bacillus, commonly inhabits the surface dirt, and yet it belongs to the class of bacteria incapable of developing in the presence of atmospheric oxygen.

It has been definitely shown by Debrand[1] and others, however, that oxygen-consuming bacteria, by using up the available oxygen in their development, create the proper anaërobic conditions necessary for the growth of the tetanus bacillus. This symbiotic growth of aërobic and anaërobic bacteria is an exceedingly common phenomenon in nature.

The tetanus bacillus and its spores have a most tenacious vitality and can live under natural conditions entirely unfavorable for the existence of most pathogenic bacteria. Living spores can exist in dust and other dry dirt.

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* Read before the American Surgical Association, June 1, 1906.

[1] Debrand. Annales de l'Institut Pasteur, 1902, 16, 427.

The bacillus thrives best at the body temperature, and can develop but little, if at all, below 60° F. On this account it may be assumed that the organism is more active during the summer months. One of us has shown [2] that the large majority of cases of tetanus in New York State occur from May to October, with June, July and August as the months of maximum activity.

That it is a frequent habitant of the intestinal tract of animals, especially horses and cattle, has been amply shown by numerous workers, but more recently by Hoffman.[3] This fact is important, as all wounds received in stables or contaminated with animal discharges are particularly to be feared. Pizzini [4] has also found it in the fæces of man. Tavel [5] and Libman [6] describe an anaërobic spore-forming tetanus-like bacillus in the human appendix.

In this connection reference should be made to the clinical evidence of the source of infection in man being sometimes in the intestinal tract.

In Table I accompanying this paper are five cases following operations performed under aseptic conditions upon the intestines and reported by Brewer (Table I *a*30), Goodrich (Table I *a*44), Willy Meyer (Table L *b*19), Kammerer (Table I *b*20) and Roe (*Table* I *b*45). Four of them were for the removal of the appendix in the quiescent period, and followed the operation twice nine and once ten and eleven days respectively, while in the fifth colotomy was performed for the removal of a cancer of the splenic flexure.

Rather more difficult of explanation is the portal of entrance of the bacillus in a case reported by Warbasse (Table I *a*36), in which tetanus appeared six days after the performance of supravaginal hysterectomy and double oöphorectomy through an abdominal incision.

That tetanus can readily follow unclean surgical procedure appears in a case reported by Mudd (Table I *c*12), in which it was the sequel of an open operation for varicocele performed by

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[2] Pease. Medical Review of Reviews, 1904, x, 524.
[3] Hoffman. Hygienische Rundschau, 1905, xv, 1233.
[4] Pizzini. Quoted by Hoffman.
[5] Tavel. für Centralblatt Bakteriologie, Erst. Abt. xxiii, 1898, 538.
[6] Libman. Quoted by Buerger. American Journal Medical Sciences, 1905, Series, cxxx, 267.

a doctor connected with an advertising institution and admitted into St. Luke's Hospital, St. Louis, after the disease had become established.

In a series of three cases reported by Fourneau as having occurred at the Goettingen *klinik*,[7] one followed a Bassini operation for the radical cure of hernia. This infection was attributed to a case of tetanus cared for on the preceding day. No case of tetanus having occurred in this *klinik* for seven years, the reporter states that they were thrown off their guard and proper precautions to avoid infection had not been taken.

The danger of the transmission of the disease in hospitals is not generally appreciated. In this country, as far as we are informed, the only hospital in which complete isolation from all other surgical patients is practised is the Pennsylvania, in Philadelphia, where all tetanus cases are transferred to the medical service for treatment.

Conditions of Infection. The occurrence of idiopathic tetanus is most unlikely. It is essential for the production of the disease that the bacillus either in its vegetative or spore state, or its toxin, must gain entrance into the tissues of the body through some injury to the skin or mucous membrane. The disease is a true intoxication, and the tetanus toxin alone is capable of producing it. Yet tetanus toxin fed to animals is not absorbed as such through the uninjured digestive tract, but is either digested or passed out with the fæces unchanged.

Once having gained entrance into the tissues, the bacillus is capable of producing its toxin only under certain conditions.

Some years ago Vaillard[8] and more recently Tarozzi[9] showed that the spores of the tetanus bacillus when freed from the toxin before injection into the body did not produce the disease, unless other substances were also injected, or conditions created which would bring about necrosis in the tissues.

While necrosis is essential for infection, neither the incubation, the onset, nor the severity of the attack is strictly dependent upon the amount of visible destruction of issue or suppuration which takes place. The explanation of this is that minute quanti-

[7] Fourneau. Deutsche Medizinische Wochenschrift, 1904, 10.
[8] Vaillard. Annales de l'Institut Pasteur, 1892, 6.
[9] Tarozzi. Centralblatt für Bakteriologie Erst. Abt. 1906, xL Originale 305.

ties of tetanus toxin have the most powerful poisonous effect, and but very slight development of the bacillus is required for the production of several fatal doses of the poison. Thus Vincent[10] has recently shown that the subcutaneous injection of small amounts of solutions of quinine and its salts, which contained tetanus spores deprived of their toxin, brought on fatal attacks of tetanus. In these cases the determining factor appeared to be the slight necrosis induced by the quinine injected. He states that tetanus is a frequent sequel to subcutaneous quinine injection, but a rare development after the subcutaneous administration of morphine. The latter drug, he states, does not produce necrosis.

Another active factor in the determination of tetanus infection is the presence of aërobic bacteria in the injured area, and the symbiotic development of them and the tetanus bacilli. Thus von Hibler[11] has shown that mildly virulent tetanus bacilli can be enhanced in pathogenic power by coincident mixed infections; Garnier[12] that the injection of typhoid cultures together with tetanus toxin increased the toxic power of the latter, and Zanfroguini[13] that the presence of the colon bacillus and the staphylococcus aureus had the same effect.

Distribution of the Tetanus Bacillus in the Body. Ordinarily the tetanus bacillus is present in the body only at the site of injury. It has been shown, according to authors quoted by Tarozzi,[14] in a few cases of tetanus in man that the bacillus was found at autopsy in the sciatic nerve, the spinal cord, the medulla oblongata, lymph nodes, cerebrospinal fluid, and spleen, and during life in the circulating blood. Tarozzi by experiment showed that spores injected into animals were found in a live state in the internal organs, especially in the liver, as late as three months afterward.

Vincent[15] found that if animals which had been injected with solutions containing spores freed from toxin were kept in incubators at high temperatures, that the bacteria were most likely to wander into the circulating blood and would develop and tetanic symptoms would be produced.

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[10] Vincent. Annales de l'Institut Pasteur, 1904, xviii, 748.
[11] V. Hibler. Centralblatt für Bakteriologie, Erst. Abt. Ref. xxxvii, 545.
[12] Garnier and Sabareau. Archiv. de Med. Experiment, 1904, 16, 557.
[13] Zanfroguini. Centralblatt für Bakteriologie, Erst. Abt. Ref., 1906, xxxvii, 650.
[14] Tarozzi. *Loc. cit.*
[15] Vincent. Annales de l'Institut Pasteur, 1904, xviii, 450.

Of the sources of infection not yet mentioned is the injection of solutions containing gelatin for the purpose of controlling hemorrhage. Two such cases are reported[16] as having occurred at the *klinik* of Helferich in Kiel. In the first instance it was given subcutaneously into the thigh two hours before the performance of laryngectomy to prevent uncontrollable capillary hemorrhage. This it accomplished. But tetanus appeared six days after, with evident septic disturbance in the thigh. The muscles of the back and lower extremities were particularly convulsed. Death followed promptly, despite the use of the antitetanic serum. The field of operation in the neck showed no evidence of infection.

In the second case it was used to control secondary hemorrhage occurring from a subphrenic abscess. After a period of six days severe tetanus appeared, which was fatal in two days.

Period of Incubation. All the factors mentioned, as determining the occurrence of tetanus, exercise a proportionate influence upon the period of incubation, the character of the onset, the course, and the termination of the disease.

The period of incubation may vary within wide limits. Rose and many others have reported incubation periods as short as twenty-four hours and even less. If what is now quite generally accepted as the path of the poison from the site of its production to the nerve centers is correct, then such cases as have been recorded with periods of incubation under three days must be accepted with considerable reserve.

And yet a case reported by Kuhn of Cassel at the Versammlung Deutscher Naturforscher und Aerzte,[17] offers a new explanation of this group of cases. A boy, a bleeder, had been operated upon for the removal of adenoids from his nasopharynx. The hemorrhage being uncontrollable, a gelatin injection was given him. At the site of injection gangrene promptly appeared and after twelve hours general tetanus was present, from which death speedily resulted. Schuckmann[18] commenting on this case expresses the opinion that the gelatin injection must have contained a poisonous dose of toxin, the injection of which, rather than the bacillus, caused the death.

[16] Deutsche Zeitschrift f. Chirurgie, October, 1901.
[17] Berliner Klinische Wochensch., 1901, p. 1118.
[18] V. Schuckmann. Deutsche Med. Wochensch., 1903, March 5.

While a short incubation period usually implies intensity of infection, Warbasse (Table I *a*38) reports the case of a patient 13 years of age, resulting from a punctured wound of the foot, from the penetration of a nail, with an incubation period of but four days. The treatment consisted in the injection of 20 c.c. of antitoxin subcutaneously. The case was one of general tetanus, yet terminated in recovery.

On the other hand in Table I appear seven cases in which the disease did not manifest itself until the nineteenth day in one, the twenty-first day in three, the twenty-fifth day in two and the twenty-sixth day in one. Four of these were treated with subcutaneous injection of the serum, two by intraspinal and one by deep intramuscular injection. All of the cases recovered except the last one. This patient, twenty-five days before, had received a punctured wound of the sole of his foot and entered Johns Hopkins Hospital on the first day of the disease. For a few days he seemed to improve under the serum treatment, and it was discontinued. Death occurred suddenly on the seventh day. This case must be considered as one in which the appearance of tetanus was delayed, but yet in which the infection was virulent when awakened into activity.

In Table II occur three cases with incubation periods of eighteen, nineteen, and twenty-two days respectively. One of them was so mild that recovery would have occurred under any treatment, and in another, the result of a burn, the general condition is stated to have been exceedingly bad and is held responsible for the death. The third recovered, having received 800 c.c. of antitoxic serum in the course of eight days.

It is interesting to note that in only one of these ten cases was a punctured wound responsible for the tetanus, most of them having been due to crushed or lacerated wounds.

The analysis of our tables furnishes some very suggestive facts upon this point. In them will be found 52 cases due to blank cartridge or gunshot wounds, presenting an average incubation period of 7.3 days with a mortality of 76 per cent., and 51 punctured wounds with an average incubation period of 7.9 days, a mortality of 74.5 per cent., while in the 28 lacerated

wounds tabulated, the incubation period was 11.8 days and the mortality 53.6 per cent.

We must now consider what occurs during the period which intervenes between the receipt of the injury and the appearance of the first tetanic manifestations.

The Relation of Toxin to the Nervous System. New light has been shed upon the pathology of tetanus by the researches of Meyer and Ransom [19] and Marie and Morax.[20] Their work has been reviewed so frequently that it is only necessary at this time to recall the main conclusions that have been reached.

The presence of tetanus toxin in the living body causes no symptoms, clinically appreciable, until it has been absorbed by the muscular terminations of the motor nerves, has passed along their axis-cylinders, and has reached the motor root-cells in the spinal cord. While the toxin is in the nerves, or in the spinal cord acting upon the spinal cells, it is effectually isolated from antitoxic substances present in the blood or lymph circulations. If, however, a nerve, or the spinal cord, be injured in such a manner as to expose the axis-cylinders or the nerve-cells to the toxin in the blood or lymph, the affinity of the toxin for such nerve element is soon manifested by awakening a tetanic condition in the part controlled by that nerve or the affected nerve-cells. Odier[21] claims that the toxin has a lytic effect on the out-runners of the motor end-plates, and that it has a somewhat similar effect upon the axis-cylinders of the nerves, proportional to the amount and concentration of the toxin passing through them. In other words, it is apparently possible for the toxin to come in contact with the nerve elements for which it has a strong affinity at only one point, namely, at the termination of the motor-nerves in the muscles. The time taken for the toxin to be absorbed and to pass through the nerves represents the large part of the period of incubation. Courmont and Doyan [22] have shown that the period of incubation in different animals is roughly proportionate to the distance between the termination of a nerve and its central nerve-

[19] Meyer and Ransom. Archiv. fur Experimentelle Pathologie und Pharmakologie, 1903, 49, Heft 6.
[20] Marie and Morax. Annales de l'Institut Pasteur, 1902, xvi, No. 11, and 1903, xvii, No. 5.
[21] Odier. Archives de Médecine Experimentale et d'Anatomie Pathologique, 1904, 16, 451.
[22] Courmont and Doyan. Quoted by Marie and Morax.

cell. The early appearance of trismus, in natural infections, can be explained by the fact that the nerve supplying the muscles of mastication is a comparatively short one. Thus, the period of incubation is the net result of the length of nerve and the degree of concentration of toxin at the point of its absorption by the nerve terminals.

It is apparently established that the toxin produced at the portal of entry of the tetanus bacillus is absorbed by the muscular terminations of the motor-nerves of the part as well as the lymphatics, is transported directly through the axis-cylinders of the nerves to the cord, and also by an indirect route through the lymphatics to the blood and thence by way of other nerve fibres to the spinal cord.

Tetanus Antitoxin. There is not the slightest question of the power of tetanus antitoxin to neutralize free tetanus toxin outside the body or in the circulating blood or lymph channels. To what extent it can release the organ-bound toxin has not yet been determined. There is no experimental nor clinical evidence that it has any effect on the toxin passing along the axis-cylinders of the nerves, even if it is present in large amounts in the circulating blood.

The histologic arrangement of the parts prevents the toxin present in the blood and lymph from acting directly upon the sensitive nerve-cells, despite its apparent propinquity. This same condition affords an effective barrier, which likewise prevents the neutralization of the toxin by the antitoxin when once the latter has passed into the axis-cylinders and has reached the nerve-cells.

The absence of a standard method of expressing the antitoxic strength of tetanus antitoxin renders it impossible to properly estimate the exact amount administered in a given case and materially interferes with our reaching definite conclusions in this regard in studying the accompanying tables.

A committee has been appointed by the Society of American Bacteriologists, to whom this matter has been referred, and we shall have, therefore, before long a standard serum of known strength.

While in the cases reported in this paper an effort has been made to specify the names of the producers of the antitoxin used, no comparison of the relative merits of the different varieties has been attempted.

A review of our tables will indicate that in many instances what might be considered large doses have been freely administered, and aside from the occasional occurrence of urticaria or dermatitis no ill effects have been noted.

Preventive Injections. From what has been said, it is quite evident that antitoxin to be of the greatest service must be administered before the motor-nerves have absorbed any toxin. The serum should, therefore, be administered as soon after the infliction of the injury as possible, and should be given to every person who has sustained an injury in which dirt, manure or foreign substance could possibly have been carried into the wound. Injuries received by persons whose labor brings them in contact with the soil, or whose work is among domestic animals, should be regarded as suspicious and should receive the tetanus antitoxin as a part of the routine treatment.

These preventive injections should, however, be given intelligently, and the size of the injection, the site chosen, and its repetition, should be regulated by the character and location of the injury.

Injuries involving the nerve-trunks should be treated with antitoxin locally as well as subcutaneously, in order to avoid the direct absorption of toxin by such injured nerves. For this purpose either liquid or dried antitoxin is suitable.

In injuries considerably contaminated by dirt the prophylactic dose given at the first dressing should be repeated on the third and fifth days, and again from the fifteenth to the twentieth day if suppuration still continues. The passive immunity conferred by a single prophylactic injection of tetanus antitoxin undoubtedly is of no longer duration than is that given by a similar injection of diphtheria antitoxin. This on the average is from three to four weeks. Yet the protection may be but for a few days. The virulence of the toxin may be maintained, although the outbreak of tetanus is deferred. As evidence of this, Sejour [23] reports a fatal case of only twenty-four hours' duration, the onset

[23] Sejour. Gazette des Hopitaux, 1905, lxxviii, 606.

of which occurred twenty-two days after the injection of a prophylactic dose in a case of compound fracture.

Suter[24] reports a case of tetanus occurring forty-seven days after the use of one prophylactic dose. He has collected eleven other cases from literature.

We are able to add six cases to this list from reports made to us personally. They are, briefly, as follows:

CASE I.— Age 8; reported by Dr. A. J. Ochsner; treated at St. Mary's Hospital, Chicago. Compound comminuted fracture of the left leg. One injection of 10 c.c. antitoxin of French make given sixteen hours after injury. No unfavorable symptoms until the twelfth day, when trismus and opisthotonos appeared, but which subsided after forty-eight hours; the patient then making an uneventful recovery.

CASE II.— Reported by Dr. Leonard Freeman, of Denver, Colo., the injury being a punctured wound of the foot due to a nail; 10 c.c. were given several hours after the injury. Local irritation and a pronounced general erythema lasting several days occurred. Six days later there was mild trismus, with soreness of the shoulders and legs. Recovery.

CASE III.— Occurred at the Pennsylvania Hospital, Philadelphia, in the service of Dr. James Tyson. The patient, forty-eight years of age, received a punctured wound in the palm of the right hand caused by a rusty nail. Four days later 30 c.c. of antitoxin were injected about the wound. On the eighth day there was pain and stiffness of the corresponding arm and forearm, associated with painful mastication. This disappeared in the course of three days.

CASE IV.— Dr. J. H. Branan, Albany, N. Y., cared for a boy fourteen years old, who received on July 4, 1905, a lacerated wound of the hand from the premature explosion of a cannon. Tetanus bacilli were found in a smear taken from the middle finger. He received an intramuscular injection of 10 c.c., July 7, and a like injection July 15. Between these latter dates he suffered from stiffness of the jaws and of the neck muscles, which cleared up and the patient recovered.

CASE V.— Dr. L. L. McArthur, of Chicago, contributes the fifth to this list of cases. The patient was injured in a street-car accident, having been rolled, crushed, and then dragged a distance before being rescued. A compound comminuted fracture of the skull resulted, dirt being ground into the wound. Both upper and lower extremities had open comminuted fractures. The injured parts received thorough surgical attention, and were made clean. On the first, second and third days she received 30 c.c. of Behring antitoxin. On the eleventh day, the wounds having done well, the scalp wound was drawn together by suture. Two days later there was a rise of temperature to 102°, and on the following day, the fourteenth after the receipt of the injury, there was trismus so that the jaws could be separated only three-eighth of an inch, and stiffness of the neck; 20 c.c. of antitoxin serum were administered. The next day an injection of 30 c.c. was given. From this time on there was a disappearance of the tetanic manifestations.

[24] Suter. Archiv. für klinische Chirurgie, 1904, lxxx, 113.
Reference Centralblatt für Bakteriologie Erst. Abt. Referate, 1906, xxxvii, 675.

Case VI.—Dr. James Bell (Table I b47) reports the case of a patient, aged 9, treated in the Royal Victoria Hospital, Montreal. He had sustained a contused and lacerated wound of the skin over the tibia and was given 5 c.c. of antitetanic serum as a prophylactic injection on the day following the injury. Although tetanus did not appear until the forty-seventh day thereafter, it was so virulent as to cause death in five days.

It is to be noted, however, in all of these cases with the exception of the sixth, that the toxin was so modified in its intensity that the tetanic symptoms were of short duration and in each instance the patient recovered. In the latter, however, although the outbreak was delayed, the virulence of the toxin persisted.

Letters received from members of this association indicate that it is the practice in the hospitals of New York, Chicago, Baltimore, Cincinnati, Cleveland, Boston, Montreal, Brooklyn and Albany to use the antitoxin prophylactically and to inject it usually subcutaneously, although in Cleveland it is given into the spinal canal, in all of the cases in which it is believed that there is danger of the development of tetanus, and with the exceptions mentioned the disease has never appeared after such injection.

At the fifteenth congress of French surgeons the treatment of tetanus was most exhaustively considered.[25] The subject was presented by M. Vallas, of Lyons. Speaking of the preventive power of the injections of the antitoxic serum, he is most emphatic in his decision that it is an agent of such positive value that with its constant use tetanus would cease to exist altogether.

No one will pretend to claim that the prophylactic injections are to take the place of the efforts to be made in each instance to render the parts thoroughly clean at the primary dressing, or to remove all possible infected tissues.

In many hospitals reliance is placed upon these procedures, and indeed this has been the policy in the hospital with which one of us is connected. In this hospital several hundred cases of wounds of such character as might have been followed by tetanus have been thus treated, and yet there has been no occurrence of that disease since 1899.

We have received the report of a number of cases treated at various of the large hospitals of the country, where excision of the infected area was practiced when possible, and thorough

[25] Association Francaise de Chirurgie, 1903.

cleansing and disinfection where this could not be done and where no serum has been used, yet tetanus has not occurred. This subject has also been considered by Bain [26] and Richardson.[27]

In the cases reported by the latter, however, the use of the antitoxic serum was combined with thorough surgical attention.

This combination of procedures is the one which should be pursued. The prophylactic injections should be given directly into the muscles, as this method affords more rapid absorption than when carried only into subcutaneous tissues as has been shown by Meltzer and Auer.[28] The injection of antitoxin into adipose tissue, as is frequently done, is probably a waste of effort and material.

The necessity of giving these injections early, so that they may indeed be protective, is made exceedingly clear when we realize that if the necessary time elapses after the introduction of the bacilli for the development of a sufficient amount of toxin, not even amputation will prevent the appearance of tetanus.

Two cases in Table I illustrate this point. In the first (Table I *b*23) a man sustained a compound fracture of the leg April 24, 1902, because of which the leg was amputated at the New York Hospital April 30th. Despite this, tetanus appeared May 3d, and death occurred the next day.

In the second (Table I *a*52), a man run over by an electric car December 26, 1905, was brought three and one-half hours later into the Massachusetts General Hospital. The wound became septic, and amputation was performed December 30th. The next day the temperature rose to 105, the neck became rigid and dysphagia appeared. Despite antitoxin, then given subcutaneously, he died January 3, 1906.

Local Tetanus. Before considering the therapeutic use of tetanus antitoxin, there remain some points to be emphasized which have a bearing thereon.

Tetanus provoked in animals as a result of experimentation exhibits almost without exception as its earliest manifestations those of a purely local character and which are at first restricted to the neighborhood of the inoculation. This is now understood

[26] Bain. Annals of Surgery, 1903, Vol. 399.
[27] Boston Medical and Surgical Journal, 1905, Vol. 152, 493.
[28] Meltzer and Auer. Journal of Experimental Medicine, 1905, 7, 59.

to be due to the absorption of the toxin by the motor-nerve of the part. The conditions favoring the local appearance of tetanus are a short motor-nerve as in head injuries; an injury to a nerve-trunk permitting the rapid absorption of a large amount of toxin; the production of a meager amount of toxin or the presence of something which prevents the admission of a large amount of toxin into the circulation.

Axhausen[29] reports eleven cases in man with but a single death in which distinct local tetanic symptoms preceded the usual manifestations. After studying these cases he concluded that they had a long incubation period averaging twenty days, that the symptoms were slow to develop and likewise to decline. In Table I will be found ten cases in which local manifestations in the part injured preceded the other evidences of tetanus.[30] Three of them resulted from head or face injuries, all recovering; two were blank cartridge wounds of the hand, one recovering; one a lacerated hand; two gunshot wounds of the thigh; one due to an abrasion of the shin; and one to a penetrating wound of the foot. The two latter recovered. The average incubation period of this group was only 9.2 days, however. Six of them recovered, showing a mortality of only 40 per cent. Our cases, therefore, verify in the main the statement of Axhausen, although the mortality was considerably higher.

Classification of Cases. Recognizing the fact as previously stated that the length of the incubation period is as a rule a good index of the virulence of the infection, for the purpose of estimating the value of the serum treatment we have divided the cases herewith submitted into two classes and shall speak of those as acute in which the incubation period was of less than ten days' duration, and of those as subacute when it was ten days or longer.

Believing that it is but natural that men would as a rule be more apt to publish their successes than their failures, we have not attempted to collect from literature the cases of tetanus which have been subjected to serum treatment. Two tables, however, are presented. The first represents the experiences gathered from many of the large hospitals of the United States. It is believed

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[29] Axhausen. Deutsche Zeitschrift für Chirurgie. 1905, 78, 265.
[30] Table I *a*, Cases 16, 17, 24, 28, 42, 45. Table I *b*, 7, 21. Table I *c*, 8. Table I *d*, 2.

that as the table includes all of the cases treated at these institutions, and in a few instances in the private practice of their surgeons, a truer estimate of the real worth of the antitoxic serum could thus be obtained. The second covers all of the cases treated in New York State in which the State Department of Health furnished antitoxin. The data for this group of cases are furnished by Dr. Pease, one of the writers of this paper, who is the director of the Antitoxin Laboratory of this State.

In Table I there are 144 cases, in No. II 59, placing at our command 203 cases. Of those in Table I, 66 were treated by subcutaneous injection; 48 by injection of the serum into various structures; 12 by intraspinal; 16 by intramuscular; 1 by intracerebral, and 1 by intravenous injection.

Of the 59 cases in Table II, 42 were treated subcutaneously; 16 by injection into different tissues, and 1 by intracerebral injection.

In Table I there were 93 acute cases, the termination being known in 91. Of these 78 died, a mortality of 85.7 per cent. The number of subacute cases in this table is 44. The final result is given as 43. There were 15 deaths, a mortality of 34.9 per cent. In 6 the incubation period is not mentioned.

In Table II the termination was given in 36 acute cases; 29 died, mortality 80.6 per cent. Of 21 subacute cases in which the result is given there were 11 deaths, a mortality of 52.4 per cent.

The mortality attending the various methods of administering the antitoxin shows the following in Table I:

Of 66 cases treated by subcutaneous injections, the incubation period is not mentioned in one case. Of the remaining 65, 47 were acute cases, the termination being known in 46. Of these 38 died, mortality 82.6 per cent.; 18 were subacute, of which but four died, mortality 22.2 per cent.

In 48 cases treated by a combination of either subcutaneous, intraneural, intraspinal, intravenous or intracranial injections, the result is mentioned in 47. Of these 30 were acute, the termination being known in 29; 27 dying, a mortality of 93.1 per cent.; 14 were subacute cases, of whom 7 died, mortality 50 per cent.

By intraspinal injection 12 were treated, in 1 the incubation period not being stated; 7 were acute cases, 4 dying, mortality 57.1 per cent. In three subacute cases, in which the result was known, all recovered. Of 16 cases treated by intramuscular injection, in 1 the incubation period is not given. Of the remaining 15, 7 were acute, all dying, mortality 100 per cent. Of the remaining 8 subacute cases, 4 died, mortality 50 per cent.

In Table II a study of the cases results as follows: By subcutaneous injection, 42 were treated; the incubation period was known in 40, and of this number 24 were acute, of whom 19 died, mortality 79.2 per cent. Of the 16 subacute cases thus treated, 7 died, mortality 43.8 per cent.

Sixteen were treated by the injection of the antitoxin into the several structures mentioned in a previous paragraph. Eleven were acute cases, 9 dying, mortality 81.8 per cent.; while of 5 subacute cases 4 died, a mortality of 80 per cent.

In each table there is recorded a single case treated by intracerebral injection alone. Both patients died.

In Table I there appears one acute case treated by intravenous injection. This patient died.

Without going into the statistics of these cases in greater detail, we can obtain from Table IV a general idea of their character and the results obtained by the various methods of administering the antitoxin.

In 127 of the acute cases, that is, those with less than ten days' incubation, the mortality was 84 per cent. In 64 subacute cases it was 41 per cent. The mortality for the entire series was about 70 per cent.

The mortality attending the various methods of administering the antitoxin is as follows:

For the cases in which subcutaneous injections were used to the exclusion of other methods, the mortality in 70 acute cases was 81 per cent.; and of 34 subacute, 43 per cent., or a total mortality for all subcutaneous treated cases of 64 per cent.

For the cases in which the injections were made into various tissues, or by two or more methods, such as the subcutaneous, intravenous, intraneural, intracerebral, intraspinal, or intramuscular injections, the mortality in 40 acute cases was 90 per cent., and

in 19 subacute 58 per cent., or a total mortality in this group of 80 per cent.

For the cases treated by the intraspinal injections through lumbar punctures the mortality in 7 acute cases was 57 per cent., and for 3 subacute all recovered, or a total mortality in this group of 40 per cent. This would seem to be a low mortality, but when we tabulate all the cases treated with intraspinal injections with or without the use of other methods, the mortality in 28 acute cases was 75 per cent. and in 13 subacute cases was 38 per cent., or a total mortality for the group of 63 per cent.

The total mortality for 15 cases treated exclusively with intramuscular injections was 73 per cent., and in two cases in which intracerebral injections were given exclusively the mortality was 100 per cent.

It can be seen, therefore, that there is no definite evidence that any particular method of injecting the antitoxin gives much more favorable results than any other.

TABLE IV

Summary of All Cases

Character.	Number.	Died.	Mortality.	Total Mortality.
Acute	127	107	84.3%	70%
Chronic	64	26	41%	
Subcutaneous Injections of Antitoxin Administered.				
Acute	70	57	81%	64%
Chronic	34	10	43.8%	
Antitoxin Administered by Two or More Methods.				
Acute	40	36	90%	80%
Chronic	19	11	58%	
Only Intraspinal Injections of Antitoxin Administered.				
Acute	7	4	57%	40%
Chronic	3	0	0%	
All Cases Receiving Intraspinal Injections.				
Acute	28	21	75%	63%
Chronic	13	5	38%	
Antitoxin Administered Intramuscularly.				
Acute	7	7	100%	73%
Chronic	8	4	50%	

The tables were carefully analyzed for the purpose of studying the degree of virulence of the cases treated by the different methods, and it appears that a larger percentage of cases with a short period of incubation, rapid progress and an early death were treated by subcutaneous injection than by any other method.

As to the amount of antitoxin injected, in but 20 cases were more than 500 c.c. administered. These cases had an average incubation period of 10.8 days; 15 recovered and 5 died, a mortality of 25 per cent. Five of the 15 recovering had short periods of incubation. The treatment was begun in these cases on an average 3.3 days after the appearance of tetanic symptoms, and the average length of its continuance was 7.4 days. The largest amount of antitoxin given a single patient was 1,495 c.c. Of the 20 cases, seven are found in Table I, with two deaths, mortality 28.6 per cent.; and 13, with three deaths, mortality 23 per cent., in Table II.

It is apparent that the amount of antitoxin administered to these patients is not the only factor to be considered in their recovery, for as a group they belong to the subacute class.

It should be stated that in most of the cases included in our tables medicinal treatment was given in addition to the serum. Occasionally it will be noted that the reporter has commented to the effect that he attributes in a given case quite as much to the drugs as the serum.

Reference might here be made to the paper by Anders and Morgan.[31] It is based upon 252 cases, in 115 of which the antitoxic serum was used. But the details of its use are so meagerly stated that we are not able to estimate its worth in the cases quoted. A few of these cases appear in our Table I. However, their conclusions as to the value of serum therapy do not differ materially from those we are compelled to reach.

Treatment of Tetanus. From the facts here presented, it is apparent that after tetanus is fully established serum therapy, however administered, promises but little as a curative agent.

A word as to the special methods of injection. The intracerebral method first practised with apparent success by Roux and Borrel[32] experimentally in animals was received for a short time

[31] Anders and Morgan. Journal of the American Med. Ass'n, July 29, 1905.
[32] Roux and Borrel. Annales de l'Institut, 1898, 12, 225.

with favor by the profession. The results obtained by it were not particularly encouraging. The two cases reported in our tables as having been treated by intracerebral injection alone both died. Table I *b* contains a list of eleven cases treated by a combination of subcutaneous and intracranial injections. Four of these cases received also intravenous injections. Of the eleven thus treated, but one recovered, a mortality of 91 per cent.

The method has nothing particularly to commend itself as a means of reaching either the free toxin or that fixed to cells of the nervous system. Moreover, it is not devoid of danger, as in the case reported by Gibb [33] first as cured and later [34] as having died of cerebral abscess. At the autopsy each frontal lobe contained an abscess cavity, the left one communicating with the left lateral ventricle, and through the great transverse fissure with the cerebellar fossæ. Every effort was made, we are assured, to perform the operation aseptically. The serum was believed to have been sterile. The suppurating condition was attributed to the frequent repetition of the injection.

The injection of tetanus antitoxin into the subdural space by means of lumbar puncture was devised by Blumenthal and Jacob.[35] This method has been used extensively. Without carefully analyzing the cases in our Table I *c*, we might be led to estimate the value of this method above its real worth. It should be noted, however, that two of the cases had an incubation period of twenty-one and twenty-six days respectively, both recovering, and that in the four cases reported by Luckett, all of whom recovered, the reporter lays greater stress upon the withdrawal of the cerebrospinal fluid than upon the injection of the antitoxin. This was done because the claim is made that it is rich in toxin and that by its withdrawal a large amount of toxin is removed. That this assumption is unwarranted appears from the investigations of Jacob and Blumenthal, [36] Meyer and Ransom,[37] Milian and Legros.[38] Luckett withdrew 161 m., 605 m., 1,556 m. and 3,610 m. of spinal fluid in these cases respectively. Moreover, it will be noted that in two of his cases local tetanus preceded the

[33] Wm. F. Gibb. British Med. Journal, April 15, 1899.
[34] Wm. F. Gibb. British Med. Journal, July 1, 1899.
[35] Blumenthal and Jacob. Berliner klinische Wochenschrift, 1898, 32, 1077.
[36] Jacob and Blumenthal. Berlin. Kl. Wochensch., 1898, 49.
[37] Meyer and Ransom. *Loc. cit.*
[38] Milian and Legros. Soc. de Biol., March, 1901.

general manifestations, a condition which we have shown indicates a mild attack of tetanus; while a third case (No. 9 of this table) it appears to us cannot be absolutely regarded as one of tetanus, and his fourth case is to be classed as subacute, judged by the incubation period.

The injection of antitoxin into the subdural space offers but little prospect of reaching the affected nerve-cells because of the protection offered by the pia mater. It has been demonstrated that even the tetanus toxin injected into the subarachnoid space does not reach the nerve-cells directly.

For this reason it has been suggested that the antitoxin be carried more deeply, and that it be introduced either into the cord or the cauda equina. Rogers [39] has practised this method in connection with intraneural and intravenous injections in six cases, with three recoveries. A seventh case included in his report occurred in a patient who punctured his left wrist with a hook July 2, 1904, and the palm of his right hand with the same hook July 10, 1904. He was not admitted into the Hospital until August 10, 1904, so that there was an incubation period of not less than thirty-one and it might have been as long as thirty-nine days. This patient received a single injection into the nerve-trunks of each upper extremity of five and ten minims respectively and 10 c.c. subcutaneously in the neighborhood of the wound in each extremity. It seems to us that this case should be considered apart from the others. Of the other three recoveries one had an incubation period of sixteen days and ran a mild course, while the other two were acute cases and the results obtained were most gratifying.

The three fatal cases were all due to crushing wounds of the extremities; two having incubation periods of ten and eleven days respectively, and one of six days.

Meyer and Ransom [40] recommended that attempts be made to neutralize the toxin present in the large nerve-trunks by the injection of antitoxin into them, and reported one case in which an attack of local tetanus was relieved by the injection of antitoxin into the motor-nerves controlling the tetanized region.

[39] Rogers. Journal of Amer. Med., Apl., July 1, 1905.
[40] Meyer and Ransom. *Loc. cit.*

Kuster [41] reported to the German Surgical Congress at its session in 1905 a similar case of localized tetanus which was relieved by injections of the proper nerves. In reviewing this case he expressed the opinion that intraneural injections could be of benefit only while tetanus is localized. Kocher and other German surgeons in the course of the discussion endorsed this view, agreeing that only the toxin present in the injected nerve could be thus neutralized. It is even doubtful whether it is possible to neutralize any considerable portion of the toxin in a given nerve by intraneural injections. Fletcher [42] has shown very definitely that it is not an easy matter to inject a nerve-trunk so that any large number of its axis-cylinders become exposed to the fluid injected. In several of his experiments in which toxin was injected into nerves the poison passed directly into the lymph-spaces of the endoneurium and did not reach any of the axis-cylinders, for no tetanus resulted. Only when he injured a considerable number of the axis-cylinders of the nerve by his injection did he succeed in producing absorption of the toxin by the axones.

Theoretically, if antitoxin comes in contact with a marked number of the axis-cylinders of an injected nerve-trunk, the symptoms in the region controlled by that nerve should cease very shortly and not recur. This is what took place in Kuester's case, for there occurred a subsequent painful myositis of the muscles supplied by the injected nerves. Intraneural injections no doubt interrupt the current through the axis-cylinders because of the mechanical pressure they produce, and thus prevent the absorption of the toxin for the time being.

But a word is necessary, in conclusion, to summarize the results of serum therapy in the light of the laboratory studies referred to and the clinical experiences herewith submitted. As a prophylactic measure it merits our fullest confidence, but as a therapeutic agent after tetanus is fully established we are forced to admit that as yet no method has been discovered whereby it can be administered so as to reach effectively the toxin not free in the blood or lymph.

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[41] Kuester. Abstract of proceedings of German Surgical Congress, 1905.
[42] Fletcher. Brain, 1903, 26, 383.

LIVER NECROSIS AND VENOUS THROMBOSIS IN HORSES ACTIVELY IMMUNIZED WITH DIPHTHERIA AND TETANUS TOXINS AND WITH STREPTOCOCCI AND THEIR PRODUCTS.*

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Our search of the literature dealing with the anatomical and histological findings in man or animals dead of diphtheria, tetanus, or streptococcus infections, either natural or artificial, has failed to reveal to us definite records of the conditions similar to those which we are about to describe.†

Law in his extensive work on *veterinary medicine* gives no descriptions of liver necrosis in the horse exactly comparable to the condition in our series. However, from the statements in his chapter on "Hepatic Hemorrhage and Rupture" we gather the impression that various degenerations of liver cells and subsequent traumatic hemorrhage and rupture of the capsule are far more common in the horse than in man. From his pathological and clinical descriptions the usual cases of hemorrhage and rupture are undoubtedly much milder than those in our horses, as the latter rarely live over ten minutes after the onset of symptoms, while he gives five hours to five days as the period of duration.

Klitine[1] calls attention to fatty degeneration of the liver cells of guinea-pigs, the subjects of chronic experimental diphtheria. Dzierzowsky[2] also mentions the occurrence of fatty degeneration of the livers of horses which have been used in diphtheria antitoxin production.

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* Read at the Sixth Annual Meeting of the American Association of Pathologists and Bacteriologists held at Baltimore, May 18, 1906.

† That liver necroses have been frequently found in horses, the subjects of diphtheria antitoxin production, is no secret to many of those in charge of laboratories where such work is carried on, but no description of this condition has been published so far as we have been able to learn.

[1] *Arch. d. Sci. Biol.* (St. Petersburg), 1900, 8, p. 2.

[2] *Ibid.*, 1902, 9, p. 298.

Pettit and Girard[3] found complete necrosis of the spleen in a horse used in the production of antiplague serum.

We have to report the finding at autopsy of more or less diffuse necrosis of the liver, or thrombosis of some of the branches of the portal or splenic veins or of the pulmonary artery, either alone or in combination, in twelve horses. These animals had been subjected to repeated subcutaneous injections of the artificially produced toxins of the diphtheria or the tetanus bacillus, or of the various preparations of living or dead cultures, or of suspensions of dysentery bacilli or streptococci. In this series there are seven horses treated with diphtheria toxin, two with tetanus, two with streptococcus, and one with dysentery. A horse treated with diphtheria toxin and killed because of its crippled condition is added to the series for purposes of comparison, as its organs were found to be normal. (See Table 1.)

Superficial postmortem examinations were made of the first three diphtheria horses, and incomplete autopsies, in that no special search for thrombosis was made, were performed on the second three horses in the series. (See Table 1.)

TABLE 1.

SHOWING AUTOPSY FINDINGS RELATING TO NECROSIS AND THROMPOSIS.*

HORSE.	SERVICE.					LIVER.		THROMBOSIS OF VEINS.		
	Disease.	Duration, Yrs.	Mos.	Sudden death.	Killed.	Necrosis.	Rupture.	Liver.	Spleen.	Pulmonary artery.
11..........	Diphtheria....	1	11	+	......	Diff. se...	+	?	?	?
17..........	Diphtheria....	2	1	+	......	Diff. s...	+	?	?	?
28..........	Diphtheria....	2		+	......	Diff. s...	+	?	?	?
36..........	Dysentery....		11	+	......	Diff. s...	+	?	?	?
37..........	Streptococcus.	1	9	+	......	Diff. s...	+	?	?	?
38..........	Streptococcus.	1	9½	+	......	Diff. s...	+	?	?	?
21..........	Tetanus......	3	3	+	......	Diff. s...	+	+	+	—
29..........	Tetanus......	3	7	+	......	Diff. s..	+	+	—	+
59..........	Diphtheria....		8	......	+†	—	—	+	—	—
57..........	Diphtheria....		4	......	+†	—	—	—	—	+
43..........	Diphtheria....	2	2	+	......	Diff. se..	+	+	+	—
50..........	Diphtheria....	1	7	+	......	Localized	—	—	—	—
56..........	Diphtheria....	1	5	......	+†	—	—	—	—	—

[3] *Compt. rend. de la Soc. de Biol.*, 1905, 58, p. 272.

* The horses reported upon in this series include all those which have died, or have been killed, after a year and a half of service under the various treatments, since the observations were started.

† Horses 59 and 57 were killed because they were in such a disturbed state that it was impossible to control them. Horse 56 was hardly able to walk on account of the nearly immovable condition of the joints of its legs, and as its serum was of no value it was killed as a matter of economy. Its tissues were normal.

As we have not been fortunate enough to be present when any of the horses died from the effects of hemorrhage and rupture of the liver, we are unable to give a detailed clinical picture of the symptoms preceding death in these cases. The general conditions as described by an attendant are as follows: The animals are apparently in their usual condition. They may have recently eaten a normal meal. Attention is first attracted to them by a rapid noisy breathing. The animal exhibits signs of collapse, and shortly falls to the floor. The breathing becomes very labored and the animal struggles. This stage is followed by a rapid and progressive loss of power, and death ensues. The whole course may not last over ten minutes.

At autopsy the peritoneal cavity contains a very large amount of fluid blood or serum and clots. The liver is usually very soft

FIG. 1.— Necrosis, Hemorrhage, and Rupture of Liver. Horse 43.

and friable, and is handled with difficulty. The capsule presents one or more ruptures, and at such places the liver substance is broken up into stringy fragments, interspersed with blood clots. (See Figure 1.)

Our attention was first called to the occurrence of thrombosis in association with diffuse necrosis of the liver by the findings at the autopsy of Horse 21, which occurred April 9, 1905. As is shown in Table 1, this animal had been in active service for the production of tetanus antitoxin for a period of over three years, and was in apparent excellent physical condition when she died in the manner already described. As the protocol of this animal gives a

fairly representative picture of the conditions found in the other horses in the series, it will be given in full.

On opening the abdomen a large amount of bloody fluid escapes and many light red clots. The intestines are distended. The glands of the mesentery in the ileocolic region are enlarged and soft. The liver for the most part presents a yellowish-gray color; within the right lobe an encapsulated hemorrhagic mass. On section it is found that the entire liver is necrotic, presenting a grayish color and a consistence resembling that of thick oatmeal. In some places there is added to this the yellowish tinge of bile. The hemorrhage in the right lobe is found to be subcapsular and infiltrates the liver substance. It is essentially a hematoma beneath the capsule. No remnant of normal liver can be made out. Everywhere with slight pressure the liver substance can be removed leaving only the connective tissue framework.

The portal veins at their entrance to the liver are everywhere filled with smooth, firm, yellowish-white clots but slightly streaked with red. (See Fig. 2.) These clots project into all the smaller branches and are definitely adherent to the vessel wall. In most instances they completely occlude the vessels in

FIG. 2,— Thrombosis in Portal Vein. Horse 21.

which they lie. On section through the liver small, firm, yellow, rigid clots protrude from the surface. The hepatic artery is free as are also the aorta and vena cava.

The spleen shows slight thickening of the capsule, and on section are found here and there a few soft swollen areas of a darker red than the surrounding tissue and in the center of each a clot similar to those found in the liver. On dissecting the main branch of the splenic vein an adherent thrombus can be followed for some distance. The splenic artery is free.

There is no accumulation of fluid in either pleural or pericardial cavity. The heart is pale, but otherwise negative. The lungs are pale and neither

congested nor edematous. There are no thrombi in the pulmonary, coronary, or other vessels of the thorax. The kidneys are pale and cloudy. The adrenals are swollen and soft.

Careful examination of vascular system shows no thrombi in vessels other than those of liver and spleen.

Anatomical diagnosis.—Widespread necrosis of liver. Hematoma of the liver. Focal hemorrhages in the spleen. Hemoperitoneum. Thrombosis of the portal and splenic veins.

Histology, liver.— Sections taken at random from different portions of the liver show practically complete necrosis without leucocytic infiltration. Here and there the nuclei in small portions of a lobule may be distinguished, as may also those of the structures in the larger portal spaces, but otherwise the destruction is complete. Much bile pigment is present in the necrotic cells.

Sections passing through the periphery of the hematoma in the right lobe show this mass to be surrounded by a definite fibrous capsule from which prolongations pass into the adjacent necrotic tissue. In this fibrous tissue is a diffuse deposition of old blood pigment.

Other sections show loose granulation tissue penetrating and replacing the blood clot. Here and there in the older portions are newly formed bile ducts and liver cells, the latter being large, pale, and multinucleated.

Sections through five thrombi differing in size show a uniform structure — a definite network of fibrin enmeshing large numbers of leucocytes. At the periphery the fibrin is compact and hyalin, forming broad bands. Small bands of similar hyalin are found also in the other portions. Only an occasional red corpuscle is seen.

Spleen.— Section through the occluded vein shows a thrombus, similar in structure to those found in the liver and intimately adherent to the vessel wall, which is greatly thinned and infiltrated with lymphoid cells. In the tissues about the vessels a diffuse hemorrhage has occurred. Elsewhere the spleen is normal.

Lymph nodes.— The sinuses are dilated and closely packed with large, pale, endothelial cells. These are but slightly phagocytic. In the lymph nodes are many plasma cells with, however, no diminution of the lymphoid cells. Throughout the lymphoid tissue is an abundant deposition of old blood pigment.

Adrenal.— Normal.

Lung.— Congestion, moderate edema in focal areas and slight thickening of walls of alveoli.

Kidney.— Cloudy swelling of epithelium of tubules, few foci of lymphoid cell infiltration.

Heart muscle.— Cloudy swelling.

Histological diagnosis.— Necrosis of liver with repair about hematoma. Mixed thrombi of portal vessels. Thrombosis of splenic veins with perivascular hemorrhage. Endothelial hyperplasia of lymph nodes with deposition of old blood pigment. Congestion and edema of lung. Cloudy swelling of heart and kidney.

ABSTRACTS FROM CLINICAL HISTORIES AND PROTOCOL.

HORSE 11.

Clinical notes.— Horse about 10 years old. Used in the diphtheria service. Had stiff leg joints at time of entering, which gradually became worse until horse was almost constantly confined to its stall.

The maximum antitoxin strength of its serum was approximately 500 units per c.c. During the last six months of its life the horse showed progressive emaciation. After a year and 11 months of treatment the horse suddenly developed the usual symptoms of hepatic rupture, and died in a few minutes.

Autopsy notes.— A superficial examination shows diffuse necrosis and hemorrhage of the liver, with rupture of the capsule and consequent hemoperitoneum.

HORSE 17.

Clinical notes.— Sound horse of uncertain age. Diphtheria service. Always remained well and active during period of treatment of two years and one month. Antitoxic strength of serum varied from 200 to 400 units per c.c.

The animal retained its usual weight until death, which occurred suddenly after the development of the usual symptoms of hepatic rupture.

Autopsy notes.— Examination incomplete. Diffuse necrosis of the liver with hemorrhage, rupture, and hemoperitoneum.

HORSE 28.

Clinical notes.— Sound horse about 12 years old. Diphtheria service. Active during entire period of treatment of two years. Maximum antitoxic strength of serum 400 units per c.c. Gradual loss of flesh during last two months of life. Had frequent abscesses at the sites of injection with accompanying high temperatures. Died during the night.

Autopsy notes.— Examination incomplete. Diffuse necrosis of the liver, with hemorrhage, rupture, and hemoperitoneum.

HORSE 36.

Clinical notes.— Sound horse about 10 years of age. Dysentery service. Progressively increasing doses of autolyzed suspensions of surface growth of agar cultures of two strains of *B. dysenteriae* were injected alternately into this horse. They produced very severe reactions, during which the temperature would often rise to 104° F., or over, and the site of the injection would become very much swollen and painful, and the animal would refuse to eat for several days.

After a total of 496 c.c. of these autolyzed suspensions of dysentery bacilli had been administered, living broth cultures of the same strains were administered. They caused much less vigorous systemic reactions.

About seven weeks before death the animal developed a severe diarrhea, which was checked with difficulty. It also began to lose weight, and finally became much emaciated. The animal was found dead early in the morning.

Autopsy notes.— Diffuse necrosis of the liver with hemorrhage, rupture, and hemoperitoneum. Other organs, including intestinal mucous membrane, normal microscopically. Cultures from the usual organs were negative. No

thrombosis was noted in any of the vessels of the liver, spleen, or lungs, but attention was not directed particularly toward this point.

Histological diagnosis.—Intense diffuse granular degeneration with irregular f .al areas of necrosis in the liver.

HORSE 37.

Clinical notes.— Sound active horse of about 12 years of age. Streptococcus service. Received, in gradually increased doses, a total of about three and a half liters of autolyzed salt solution suspensions of a rabbit-virulent streptococcus, grown on the surface of large agar plates, and later about half a liter of broth cultures of the same streptococcus. Small subcutaneous abscesses followed the later injections. The animal retained its weight and activity during the treatment. It was found dead one morning.

Autopsy notes.— Diffuse necrosis of the liver with hemorrhage, rupture, and hemoperitoneum.

HORSE 38.

Clinical notes.— Streptococcus service. Age uncertain, but animal appeared to be at least 20 years old. Had somewhat crippled legs. Became emaciated during the last two months of life. The treatment was the same as was given Horse 37 and was started at the same time, except that another streptococcus was used. This animal also died during the night, about two weeks after the death of Horse 37, and the autopsy findings were in general the same as those of that animal.

HORSE 21.

Clinical notes.— Sound active mare about 16 years old. Tetanus service. Always well. Remained active and retained its weight during life. She died in the manner already described. (Full protocol will be found in the text.)

HORSE 29.

Clinical notes.— Sound active horse about 10 years of age. Tetanus service. Remained well until about two months before death, when it had frequent rises of temperature and difficulty of breathing which were directly due to the toxin injections. During the last half-year had frequent acute abscesses at sites of injection. This horse died in the manner already described.

Autopsy notes, anatomical diagnosis.— Diffuse necrosis of the liver with subcapsular hemorrhages and rupture. Hemoperitoneum. Multiple thrombi of portal veins. Multiple thrombi of pulmonary arteries. Multiple infarcts of the lungs. General lymphatic hyperplasia.

Histological diagnosis.— Necrosis, congestion, and hemorrhage of the liver. Thrombosis of portal veins and pulmonary arteries. Focal edema and congestion of the lungs with slight leucocytic exudate. Acute endothelial hyperplasia of the lymph nodes. Congestion of the spleen. Acute interstitial (non-suppurative) nephritis. Tests of liver and kidneys for amyloid changes were negative.

HORSE 59.

Clinical notes.— Diphtheria service. Sound active horse about 10 years old. After eight months of treatment was taken suddenly while in the paddock with

difficulty of breathing and evident distress. Respiration became very rapid and labored, and at the same time there was very marked spasmodic tenesmus, but no dung was passed. Pulse rate about 90. The horse became weaker as the above condition continued, and finally was unable to stand, and when down struggled violently, so that it became necessary to kill him about five hours after the onset of the symptoms. The maximum antitoxic strength of the serum was 300 units. The last bleeding occurred about 10 days prior to death.

Autopsy notes, anatomical diagnosis.— Thrombosis of portal veins. Focal hemorrhages of liver and spleen.

Histological diagnosis.— Granular degeneration and focal hemorrhages of liver. Leucocytosis.

HORSE 57.

Clinical notes.— Diphtheria service. Sound horse 10 years old. This animal had lived under the same conditions as the other horses in the service for 10 months before the treatment was begun. The toxin injections were pushed with considerable vigor, so that during the four months of treatment he received 14 injections, and had an average of nearly 3.9 days of temperature over 101° F. for each injection given, which is the maximum for any of the horses in this series. The animal appeared to stand them satisfactorily, and gave a serum of 300 units per c.c. at the second bleeding. Immediately after the third withdrawal of eight liters of blood the animal suddenly fell to the floor in a state of collapse. Nothing was thought of this, as it is not an uncommon occurrence when larger amounts of blood are withdrawn. The horse did not attempt to rise later on, and all efforts to stimulate the animal with strychnin, etc., and to support him in slings, were futile. That night and the following day he struggled violently, and could not be quieted with full doses of morphine or chloral. The next night, and also part of the following day, he rested comfortably. Later he again became violent, and as the temperature rose to 106, and as it seemed impossible to control him, he was killed in the evening. His head and shoulders were badly bruised, and as the autopsy was not performed until the next morning, the tissues and organs showed a well-developed gas bacillus infection at that time.

Autopsy notes, anatomical diagnosis.— Acute endarteritis and thrombus formation in the main trunk of the pulmonary artery. Thrombosis of intrapulmonary branch of left pulmonary artery. Atalectasis of portion of left lung. Hemorrhagic infarct of left lung. Cloudy swelling of the myocardium. Fatty transformation of the liver with evidences of gas bacillus infection. No hemorrhage or other evidence of antemortem necrosis was apparent.

Histology.— Complete postmortem decomposition with gas blebs in the liver and lungs. Tests for amyloid changes in all organs were negative.

HORSE 43.

Clinical notes.— Diphtheria service. Sound horse about 10 years old. Remained well and active during treatment for two years and two months. During the last few months of life was subject to abscess formation at sites of injection. Its serum showed 500 units per c.c. after three months of treatment, and varied from that point to 700 units during the next year, after which time it varied from 300 to 500 units, until three months before death it

dropped suddenly to below 200 units. Death occurred in the manner already described.

Autopsy notes, anatomical diagnosis.— Extensive necrosis of the liver with multiple hemorrhages. (See Fig. 1.) Thrombosis of small branch of the portal vein in the right lobe. Rupture of encapsulated hemorrhages in the peritoneum. Hemoperitoneum. Thrombosis of the splenic veins. Hemorrhage and edema of gastrohepatic lymph nodes. Chronic peritonitis.

Histological diagnosis.— Necrosis and amyloid degeneration of the liver, with moderate regeneration. Chronic hemorrhagic cysts of the liver. Organizing thrombi of portal and splenic veins. Amyloid degeneration of Malpighian bodies of spleen. Proliferation of intima of splenic arteries. Hemorrhage and endothelial hyperplasia of gastrohepatic lymph nodes.

HORSE 50.

Clinical notes.— Diphtheria service. Horse of uncertain age, of good condition on entering. Gradually became almost helpless through stiffness of joints and blindness. Had frequent abscess formations at sites of injections. Antitoxic strength of serum never over 300 units per c.c., and usually from 200 to 250 units. Was found dead one morning, and stall showed evidences of continued struggling. The front of the stall was covered with frothy mucus. The coughing-up of this material has never been observed in the horses dying from rupture of the liver.

Autopsy notes, anatomical diagnosis.— Necrosis and hemorrhage of left lobe of the liver. Congestion of lungs and the right lobe of the liver. General lymphatic hyperplasia. Abscess of subcutaneous tissues of back. Cloudy swelling of heart and kidneys. Acute endarteritis of left renal artery. Thickening of intima of splenic artery. Focal lesions of adrenals. Chronic peritonitis.

Histological diagnosis.— Congestion, edema, hemorrhage, amyloid degeneration, and necrosis of the liver. Chronic interstitial myocarditis. Subpericardial hemorrhage with hyalin degeneration of muscle fibres, and leucocytic infiltration. Edema and congestion of lungs with hemorrhages. Edema and hemorrhages of lymph nodes. Amyloid transformation of Malpighian bodies of the spleen. Localized endarteritis and mesarteritis of left renal artery.

HORSE 56.

Clinical notes.— Diphtheria service. Horse about nine years old on entering. Developed stiffness of joints and became badly crippled. Antitoxic strength of its serum was rarely up to 300 units per c.c., and usually showed but 200 units. After a year and five months of treatment the animal was killed.

Autopsy notes.— Macroscopically and microscopically the liver, spleen, kidneys, pancreas, adrenals, lymph nodes, lungs, and heart muscles appeared to be normal.

Table 1 presents a summary of the findings relating to necrosis of the liver and thrombosis in 12 horses which have presented such changes, and also gives those of one horse in whom all the organs were normal, although it had been subjected to active treat-

ment with diphtheria toxin for a period of a year and five months. The other changes found in the tissues of these 12 horses varied to some extent, but such changes did not differ greatly from those to be found in the tissues of fatal cases of diphtheria in man, such as endothelial hyperplasia of lymph nodes, and cloudy swelling of kidney epithelium and heart muscle, etc.

One or two unusual findings were, however, observed. In Horses 43 and 50, belonging to the diphtheria service, amyloid changes were observed in both liver and spleen, and especially in the latter, but were not present in the kidney, heart muscle, or lymph nodes. These animals had developed an unusual number of subcutaneous abscesses at the sites of the toxin injections during the later months of their lives.

In the liver in tetanus horse 21 around the margin of a subcapsular hematoma, and in the necrotic liver of diphtheria horse 43 about the larger portal spaces were found evidences of attempted regeneration in the way of newly formed false bile ducts, and, especially in the latter horse, of columns of newly formed liver cells. In the necrotic livers of the other horses there were no evidences of repair. Also in the tetanus horse 29 there were evidences of beginning interstitial nephritis, of the acute non-suppurative type found in diphtheria of man, accompanying widespread disintegration of the epithelium of convoluted tubules.

A study of Table 1 will show that horses presenting necrosis of the liver did not, in all cases, show thrombosis in any organ, nor in animals presenting both conditions was the thrombosis in the hepatic veins always as extensive in its distribution as the necrosis. On the other hand, two diphtheria horses presented thrombosis without evidences of liver necrosis. Unless, therefore, the thrombosis in some instances is secondary and dependent upon the necrosis, and in other cases upon other conditions, we cannot attach much significance to their fairly close association.

That the necrosis is not usually of sudden or rapid development is shown by the fact that the livers of two horses, tetanus horse 21 and diphtheria horse 43, presented encapsulated hematomas of various sizes scattered throughout the liver substance. The thickness of the capsules and the character of their contents indicated

their formation at least several months prior to death, which in turn demonstrated the still earlier existence of extensive necrosis.

With the object of ascertaining whether there existed any common factor in the clinical histories of these horses which might assist in arriving at either the etiology of the liver necrosis or the thrombosis, or of both, the individual factors in the history of each horse which has died since these conditions were noted, have been worked out and are compared in Tables 1, 2, 3 and 4.

It is evident from the fact that some horses in the diphtheria, tetanus, streptococcus, and dysentery services presented diffuse necrosis of the liver, that this condition is not due to any special pathogenic property of any one of the organisms used in the immunizations. If, however, it is the result of the activity of some bacterial property, it is not necessary to suppose that the agent in all cases belongs to either the soluble toxins or the so-called bacterial endotoxins, for the reason that the tetanus horses received only toxin which had been filtered through Pasteur-Chamberlain filters, and consequently no bacterial bodies were injected; and, on the other hand, the streptococcus horses which received large amounts of dead cultures were equally affected.

It hardly seems probable that any of the constituents of the various media used in the preparation of the toxins and toxic products, such as the meat extractives, peptone, etc., could be the causative agent of the liver necrosis, for the reason that the two horses of the streptococcus service (37 and 38) received only about 500 c.c of broth containing such materials during a period of about one and three-quarters years, the later other injections consisting of suspensions of bacteria or their bodies in physiological salt solution. (See Table 2.)

Neither can any effect produced by the repeated abstraction of blood from such horses be the main cause of the liver necrosis, for, as is seen in Table 2, Horse 36 in the dysentery service was bled only one liter on a single occasion, and the streptococcus horses 37 and 38 had bled eight liters, abstracted on only six and seven occasions respectively during a period of a year and three-quarters. On the other hand, Horse 56 of the diphtheria service

was bled eight liters on 18 occasions during a period of a year and a half, and at death its liver was absolutely normal.

TABLE 2.

SHOWING RELATION OF THE MATERIALS INJECTED AND OF REPEATED BLEEDINGS TO LIVER NECROSIS.

HORSE.	Toxic broth injected.	Autolyzed or dead bacterial suspensions.	Amount carbolic acid injected.	Number of bleedings (8 liters each.)	Condition at death.	Extent of necrosis.
11	42 liters	....	210± c.c.	21	Poor	Extensive
17	59 liters	....	295±	25	Good	Extensive
28	58 liters	....	190±	20	Poor	Extensive
36	....	800 c.c.	2½±	0	Poor	Extensive
37	....	4 liters	17±	6	Good	Extensive
38	....	4½ liters	19±	7	Poor	Extensive
21	63 liters	....	165±	29	Good	Extensive
29	78 liters	....	235±	35	Good	Extensive
43	77 liters	....	385±	25	Good	Extensive
50	50 liters	....	250±	15	Poor	Left lobe
56	33 Liters	....	165±	18	Poor	No necrosis

It is likewise possible to exclude the antiseptics used in the preservation of the bacterial toxic agents as an important factor in the production of liver necrosis, although nearly all the toxic materials administered contained from 0.3 to 0.5 per cent. of either carbolic acid or trikresol. A study of Table 2 will show that the actual amounts of these antiseptics received by the different horses varied from about 2.5 c.c. during 11 months in the case of dysentery horse 36, and about 17 and 19 c.c. in the streptococcuc horses 37 and 38 respectively, to 165 and 235 c.c. in the tetanus horses 21 and 29 respectively, and from 190 to 385 c.c. in the various diphtheria horses presenting necrosis of the liver. In other words, the horses receiving the larger amounts of antiseptics lived the longer periods.

Nor could we explain the necrosis of the liver by any general disturbance of metabolism due to the injections of the bacterial toxic agents, for some of the animals which showed the most diffuse necrosis were to all outward appearances and according to their weight in excellent physical condition, as is indicated in Table 2.

There is also no apparent reason for believing that the conditions under which such horses are kept in antitoxin stables is the main factor in the causation of the necrosis. Diphtheria horse 56 was kept under the same conditions as the others for a period of a year and a half, and at autopsy the liver was normal.

A careful study of the temperature charts and a knowledge of the manner in which the horses withstood the injections will, perhaps, give as likely an explanation of the causation of the necrosis as can be found. In Table 3 will be found the number of days during the treatment of each horse, in which the temperature stood at the various points from 101° to 105°+ Fahrenheit. It will be seen that a fair degree of uniformity exists in this number of days of fever in the animals which had necrosis of the liver. These increases of temperature cannot be accepted, however, as an exact index of the character of the reaction, as some horses commonly have considerable fever without any other manifestation of serious disturbance after toxin injections. However, the variations in the temperature curves are due largely to the type of immunization. Thus the dysentery horse had apparently fewer days of temperature than those used in the diphtheria work, but he lived under the treatment only about one-half as long as the latter. It is well known that horses are particularly susceptible to injections of cultures of true or paradysentery bacilli; and this horse withstood the injections very poorly. On the other hand, the horses treated with injections of even large doses of tetanus toxin show only slight disturbances, and in harmony with this is the long duration of the period of treatment in Horses 21 and 29, each of which lived considerably over three years. The two streptococcus horses with-

TABLE 3.

SHOWING RELATION OF REACTIONS DUE TO TOXINS INJECTED TO LIVER NECROSIS.

Horse.	Disease.	Duration of treatment.		Number injections.	Days of Temp. over 101° Fahr.					Aver. days of temperature for each injection
					101 to 102.	102 to 103.	103 to 104.	104 to 105.	Total.	
		Yrs.	Mos.							
11	Diphtheria	1	11	75	95	73	14	1	183	2.4
17	Diphtheria	2	1	77	85	75	22	2	184	2.4
28	Diphtheria	2		69	92	74	38	9	213	3.1
36	Dysentery		11	46	86	62	14	4	166	3.6
37	Streptococcus	1	9	54	76	44	19	2	141	2.6
38	Streptococcus	1	9½	60	98	48	5	1	152	2.5
21	Tetanus	3	3	126	95	69	9	1	174	1.4
29	Tetanus	3	7	138	135	53	8	2	198	1.4
43	Diphtheria	2	2	77	92	65	31	3	191	2.2
50	Diphtheria	1	7	64	79	39	20	0	138	2.1
56*	Diphtheria	1	5	59	63	57	34	2	146	2.4

*No liver necrosis in this horse.

stood the injections about as well as the diphtheria animals. Each lived approximately a year and three-quarters, and that was nearly the average life, a year and 11 months, of the five diphtheria horses.

As the horses used in each service lived approximately the same length of time under their respective treatments as, and as the animals receiving the injections of the toxins causing the milder reactions lived for considerably longer periods than, did those receiving toxins producing the most violent reactions, and as we have excluded other possible factors, we are led to the conclusion that the liver necrosis is, without much doubt, mainly the effect of the administration of repeated doses of the bacterial products.

That some of the other factors which appear to be excluded by our findings may be contributory to the main causative agent in some instances cannot be denied.

A possible relationship between the effect of the toxic products of these bacteria on the liver cells and the production of antitoxic or other anti-bodies is not capable of either positive or negative determination from the available data.

In the diphtheria and tetanus horses under consideration no relationship can be made out between the course of the necrotic changes in the liver and the well-known progressive decrease in the antitoxic strength of the sera of some horses after prolonged treatment. Thus diphtheria horse 50, which had necrosis of the liver, gave an antitoxin of from 300 to 350 units per cubic centimeter in only two early bleedings out of a total of 15, the others producing sera of from 200 to 250 units. On the other hand Horse 56, which showed a normal liver when killed after an immunization life of one year and five months, gave almost identically the same grades of serum in 17 bleedings. That is, the early bleedings gave sera of 400 units, and those subsequently from 300 down to 200 units, which was the strength at the time the animal was killed. These findings would seem to indicate that the customary decrease in antitoxic power, which occurs in the sera of many horses as their immunization proceeds after the first few months, is not exclusively due to a progressive liver necrosis. However, the amount of data obtained does not permit us to draw any conclusions concerning the possible relation

of the liver to antitoxin production. The bleedings are too infrequent, and the continuation of the antitoxic power of the serum is probably dependent upon so many factors that the absence of liver necrosis in one horse whose serum had shown the usual progressive loss of power, is entirely insufficient evidence to warrant the exclusion of the liver as a factor in antitoxin production.

Brunton and Bokenham[4] have endeavored to show that the liver is capable of producing diphtheria antitoxin by the action of toxin passed through the portal venous system. While it might be questioned whether they have clearly proven the formation of true antitoxin, they undoubtedly showed that the liver cells have an affinity for pure diphtheria toxin, and are capable of at least greatly reducing the poisonous power of the crude product.

A similar affinity of the liver cells of some invertebrates for tetanus toxin has been claimed by Metchnikoff.[5] He states that in scorpions injected with tetanus toxin the liver is the only organ which absorbs and retains the toxin.

If the liver is capable of absorbing large amounts of the toxic bacterial products, and if their direct action on it is the means of producing liver necrosis, then in most horses treated with such agents the liver is very probably capable of disposing of large amounts of these products without injury; for the liver necrosis is not present in many horses, at least, which have come to autopsy after injections of considerable amounts of diphtheria toxin distributed over several months. (See History of Horse, 56.)

In view of recent work on autolysis of liver tissues *in vitro,* it may not be out of place to consider the possibility that this late necrosis is due to alterations or disturbances of those factors which prevent the action of the autolytic ferments normally present in the liver.

Baer and Loeb[6] have shown that weak alkalis retard and weak acids stimulate the autolytic ferments in the liver, and that the elements in normal serum which strongly retard or prevent autolysis are the serum albumen and the fibrinogen, while the serum globulin has the opposite effect, namely, a strong stimulating action on the autolytic ferment.

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[4] *Jour. Path. and Bact.*, 1904, 10, p. 50.
[5] *L'Immunité*, etc., Paris, 1901, p. 343.
[6] *Arch. f. exper. Path. u. Phar.*, 1905, 53, p. 1.

Hiss and Atkinson,[7] Butjagin,[8] and others claim that an increase in the glcbulin content of the blood occurs during active immunization, although this is disputed by Müller.[9]

Butjagin also demonstrated a gradual decline in the alkalinity of the blood during the later part of the period of immunization.

In view of the work of Baer and Loeb, the occurrence of these or other similar blood changes may have some relation to the development of the liver necrosis or autolysis.

THROMBOSIS

Of the horses upon which careful autopsies were performed and which presented necroses of the liver, extensive coexisting thrombosis of the veins of that organ was found in one (Horse 21), and to a lesser extent in two others (29 and 43). In the horses treated with streptococcal and dysenteric bacterial products, no careful searches of the entire substance of their livers with this point in view were made.

In one diphtheria (43) and in one tetanus (21) horse the veins of the spleen were likewise the seat of thrombosis to a greater or less extent. The other tetanus horse (29) had extensive thrombosis of the pulmonary arteries and infarction of the lungs.

As has been stated, two diphtheria horses had thrombosis occurring without necrotic changes in the liver. In one (59) the thrombosis was confined to three large branches of the portal vein in the liver, while in the other (57) the thrombosis was present in the main branch of the pulmonary artery and in the intrapulmonary branch of the left pulmonary artery. In the latter horse the clinical manifestations arose immediately after a withdrawal of the usual eight liters of blood, and may have been due to the formation of a blood clot at the site of this operation and the detachment and passage of the clot into the venous circulation. The thrombus in the main pulmonary artery was in the form of a pedunculated vegetation about the size of a walnut. The horse apparently suffered considerable thoracic pain, and was so weak as to be unable to stand even with the assistance of slings.

[7] *Jour. Exper. Med.*, 1900, 5 p. 47.
[8] *Hyg. Rund.*, 1902, 12, p. 1193.
[9] *Beiträge z. chem. Physiol u. Path.*, 1905, 6, p. 454.

The other horse (59) with localized thrombosis of the portal veins gave indications of great pain in the abdominal cavity, with tenesmus, and also complete prostration and excessively rapid respiration and a high pulse rate. After the continuation of these symptoms for about five hours the animal was killed, and the autopsy performed immediately.

If the conditions operating to produce the thrombosis in this case are the same as in those where the thrombosis coexisted with liver necrosis, it is remarkable that it should have occurred as early as the eighth month of the immunization period, and that the clinical symptoms should be so much more severe than in those cases where thrombosis occurred later and more extensively.

In looking for some factor or condition operative during the period of treatment which might be considered as of etiological significance for the thrombosis, we are not afforded as much data as we would like, owing to the failure to examine and note particularly the presence or absence of thrombi in the first few animals which died from rupture of the liver with hemorrhage. Thus we have no definite information on this point in three diphtheria, one dysentery, and two streptococcus horses.

From the data tabulated in Table 4 it can be seen that by excluding the horses with early thrombosis the treatment given and its effects on the three remaining horses are quite similar. The only exception is to be found in a considerable difference in the

TABLE 4.

RELATION OF THE TREATMENT OF HORSES TO THE DEVELOPMENT OF THROMBOSIS.

No.	Diseases.	Immunization period.	Liters of broth injected.	Amount of carbolic acid injected.	Days of tem. over 101°.	Number of bleedings of 8 liters each.
59	Diphtheria	8 mos.	16½	82± c.c	91	7
57	Diphtheria	4 mos.	5¼	27±	54	43
21	Tetanus	3 yrs. 3 mos.	63	165±	174	29
29	Tetanus	3 yrs. 7 mos.	78	235±	198	35
43	Diphtheria	2 yrs. 2 mos.	77	385±	191	25

amounts of carbolic acid or trikresol which the horses received with the toxins injected. We are of the opinion that these antiseptics played no essential part in the production of the conditions favoring thrombosis.

We cannot, however, readily exclude in this way a possible influence favoring thrombosis by the injection of those elements which make up the broth used for toxin production, such as peptone meat extractions, etc. Likewise we cannot exclude the effects of the repeated abstraction of eight liters of blood every three or four weeks. We are unable, therefore, by any process of exclusion to form any definite opinion of the part played in the thrombosis by the pathogenic activity of the bacterial toxins injected into these horses.

If, however, we ascribe to the early thrombosis the same etiological conditions as bring about the late thromboses, then we can find no common factor in the treatment of our horses which might have been operative in the determination of this condition.

There are, however, some noteworthy features in the relation of thrombosis to the liver necrosis in some of the horses.

Thus in Horse 50, which was the only animal with necrosis of the liver which was thoroughly examined for thrombi and none found, the necrosis and hemorrhage of the liver was not general but localized almost exclusively in the left lobe, and was evidently not so far advanced as in the other animals. As the autopsy also revealed myocarditis with small subpericardial hemorrhages, and amyloid degeneration of the liver and spleen, local endarteritis, edema, and congestion of the lungs with small hemorrhages, it is not unlikely that the animal did not die from the effects of the liver necrosis, especially as there was no rupture of that organ. It is not improbable, therefore, that thrombosis would also have occurred in this horse if he had lived longer.

In Horse 29 the portal veins in which thrombi were found corresponded closely with the areas of necrosis in the liver, and it was noted that the thrombosis seemed to proceed from the smaller veins outward into the larger branches, ending there in large, round-ended clots.

In Horse 43 the extensively necrotic liver showed thrombosis only in one small portion of the right lobe, but considerable thrombosis occurred in the spleen.

Thus, taking the findings as a whole, it can be stated that while all necrotic areas in the liver did not have coexisting thrombosis, there were no thrombi in the portal veins other than in the necrotic

portions, except in the two horses already described which died with early thrombosis without necrosis. It is possible, therefore, that in some animals, at least, the portal thrombosis may be caused by lesions of the vessel walls secondary to the liver necrosis.

It is the opinion of Smith[10] that the pathological effects of the periodic losses of blood in antitoxin horses lead in certain cases to serious derangements and death. He shows that in many horses which have been bled five liters every three or four weeks for periods of from nine months to over four years, the red blood corpuscles have a reduced osmotic tension. He believes that this condition is due to the repeated bleedings and not to the toxin injections.

In Pettit and Girard's case of necrosis of the spleen in an anti-plague horse, the authors express the qualified opinion that the necrosis was not due to the periodic bleedings.

In so far as necrosis of the liver is concerned, our data do not warrant the conclusion that the periodic bleedings have any special etiological relation to it. If, therefore, the lowered osmotic tension is due to the repeated losses of blood, it is not probable that such lowered tension is in any way responsible for the liver necrosis. Whether it is or is not a factor in the causation of the thrombosis we are not prepared to state.

Butjagin has shown the presence of this phenomenon and also the existence of such alterations in the blood serum as an increase in the specific gravity, changes in albumen and globulin content, electrical conductivity, alkalinity, and refractive index during the immunizing process.

Similar work on one or more of these aspects of the subject has been reported by Müller[11] and others.

What relation exists between these alterations in the morphological, chemical, and physical conditions of the blood constituents and the pathological conditions noted by us, remains to be solved.

SUMMARY

In a series of 12 horses, actively immunized with the products of certain pathogenic microorganisms, autopsies revealed

[10] *Jour. Med. Res.*, 1904, 12, p. 385.
[11] *Loc. cit.*

widespread liver necrosis in nine, and localized liver necrosis in one.

Thrombosis of the portal veins was present in three, of the splenic vein in two, and of branches of the pulmonary artery in one, of the nine horses showing widespread necrosis. One horse had thrombosis of branches of the portal veins and another of the pulmonary artery without liver necrosis. Six horses were not carefully examined for thrombosis.

The evidence obtained tends to exclude the materials such as peptone, beef extractives, and antiseptics, such as carbolic acid, injected with the toxins, and also the repeated bleedings practiced, from any important rôle in the production of the liver necrosis. On the other hand, the evidence leads to the conclusion that the toxic bacterial products injected are directly or indirectly responsible for the production of this pathological condition.

The evidence is not sufficient to determine which, if any, of these factors is responsible for the occurrence of the venous thrombosis. A possible etiological action by the antiseptics injected is excluded. In some cases the portal thrombosis may result from the liver necrosis.

NOTE.— Since this paper went to press another horse (No. 60) has died after a year and four months of treatment. During the first four months of this period it received diphtheria toxin, and after that until death small doses of tetanus toxin. The horse had a very slightly varying temperature of from 104° to 106° during the two weeks prior to death, and gradually became weaker during the last few days of life, and died during the night. Just prior to the onset of the high temperature an edematous condition of the genital sheath developed, followed by a tremendous increase in the size of the penis, apparently due to venous stasis. Later the use of the left hind leg became impaired.

At autopsy thrombosis of the left iliac vein, the inferior vena cava, the veins of the tissues about the penis, the splenic vein outside the spleen, the portal vein, and some of its branches in the liver, and of some of the pulmonary arteries was found. There was no evidence of necrosis in the liver. There was a general hyperplasia of the lymph nodes.

STATE HYGIENIC LABORATORY

STATE HYGIENIC LABORATORY

In the annual appropriation bill, chapter 683 of the Laws of 1906, was inserted the following item:

"For the necessary expenses of equipment and maintenance of the State Hygienic Laboratory and for the services of the Bender Laboratory, seven thousand dollars or so much thereof as may be necessary."

This appropriation became available October 1, 1906, and the period covered by this report is, therefore, but three months.

It being considered desirable to consolidate and coördinate the various branches of laboratory work, Dr. H. D. Pease, Director of the Antitoxin Laboratory, was appointed director of the State Hygienic Laboratory, and all these lines of work were placed under his immediate direction.

As is indicated by the terms of the appropriation item the work on the laboratory diagnosis of diphtheria, the examination of sputum for tuberculosis, the serum test for typhoid, and the bacteriological water work formerly carried on under the title of the Bureau of Bacteriology and Pathology in the Bender Hygienic Laboratory, becomes a part of the work of the State Hygienic Laboratory and that part of this work carried on in the Bender Laboratory after October 1st should be credited to the State Hygienic Laboratory, although for this year it will appear under the former title.

In anticipation of the new work of the Hygienic Laboratory, additional quarters for it were planned for in the early summer and were nearly completed and partly in use by October 1st.

These were provided for by building an addition to the frame building used by the Antitoxin Laboratory for its work, at 276–278 Yates street, Albany.

This addition 21 x 28 feet and two stories high was constructed in harmony with the Antitoxin Laboratory, namely a frame

building without cellar, and can only be considered in the light of temporary quarters until such time as an appropriation can be obtained for suitable buildings in which the laboratory work of the State Department of Health can be conducted.

The contract for this building was entered into on August 2, 1906, and the work begun at once. The total cost of this structure was $2,406.34.

On September 1, 1906, Mr. Leonard W. Wachter, then chemist in charge of the Albany filtration plant, and a man with broad training and experience in the various lines of sanitary chemistry and particularly in its relation to water and sewage purification, was appointed sanitary chemist to the laboratory, and on October 15, 1906, Mr. Mott C. Cunningham, Director of the Antitoxin Laboratory of the H. M. Alexander Company, of Marietta, Pa., and formerly assistant bacteriologist and chemist of the health department of the city of Pittsburg, was appointed assistant bacteriologist.

SEWAGE EXPERIMENT STATION

The annual supply bill having carried an appropriation for sewage investigations, and as the board of sewer commissioners of Saratoga Springs, through its president, Dr. D. C. Moriarta, offered the use of a small laboratory building upon the grounds of their comparatively new and complete sewage disposal plant, a small laboratory or experiment station for the prosecution of this work was inaugurated and became a part of the State Hygienic Laboratory.

Dr. D. C. Moriarta was appointed director of the laboratory.

Mr. Wachter personally supervised the installation of the apparatus and on November 1, 1906, Mr. Albert J. Slack, of Boston, was appointed assistant sanitary chemist in the State Hygienic Laboratory and was assigned to the work at Saratoga. Until January 1st he was ordered to make a study of the newer methods in use in the Sanitary Research Laboratory of the Massachusetts Institute of Technology, in Boston.

The director of the station, Dr. Moriarta, has submitted a communication regarding the Saratoga Springs sewage disposal system and its possible relation as an educational and experimental

plant for the benefit of the State at large. The large possibilities of this plan should not be lost sight of.

This report will be included as an appendix to this report.

INVESTIGATION OF CANNED MEATS

Prior to beginning the routine work of the State Hygienic Laboratory, a special investigation of the canned meats found on sale in this State was instituted by the director of the laboratory and by Dr. Holmes C. Jackson, Adjunct Professor of Physiological Chemistry of the Albany Medical College. The latter was on August 29, 1906, appointed consulting physiological chemist to the State Hygienic Laboratory.

This investigation consisted of the inspection and the microscopical examination of 154 samples of canned meats, and their chemical analysis for the detection of preservatives and their physiological analysis for the determination of the digestibility of their contents. The following is the completed report:

Report on the Examination of Canned Meats

In all there have been examined 154 samples, consisting of such products as so-called roast, corned, dried and potted beef; whole and potted tongues; potted and deviled ham, chicken and turkey; various kinds of canned sausages; and a number of other meat products. Three samples of lobster, crab meat and salmon were also examined.

All of the 154 samples collected were examined chemically for the presence of boron compounds. A few were tested for the presence of sulphites and benzoic acid, but the presence of neither of these latter substances was detected.

Samples Containing Boron Preservatives

The use of any preservative in a food to be enclosed in a can which can be satisfactorily sterilized by the use of heat and sealed hermetically indicates that the materials to be placed in the can were in such a state, or were kept under such conditions, as to lead the canner to believe that they required the use of a preservative for the prevention of decomposition until they could be safely canned.

The finding of a boron preservative in a sample of "potted ham," in which were found numbers of *Trichina spiralis,* clearly indicates that in the minds of those who prepared this meat it required a preservative in order to prevent its decomposition before it could be sterilized in the can.

It is not easy or always possible to ascertain from an examination of a sample of canned meat containing a preservative whether decomposition had already set in at the time the preservative was added or not, but the possibility or the probability of the development of such undesirable changes must have been present or the preservative would not be added.

The following samples of canned meats contained a boron preservative:

One can corned beef, Cudahy Canning Co.

One can sliced beef, J. W. Beardsley Sons, New York.

One can potted ham, Cudahy Canning Co.

One can potted ham, Columbia Conserve Co., Indianapolis, Ind.

One can ham loaf, Cudahy Canning Co.

One can deviled ham, Armour & Co., Chicago, Ill.

One can deviled ham, German-American Provision Co., Chicago, Ill.

One can sausage, Cudahy Canning Co.

Two cans sausage, Armour & Co., Chicago, Ill.

One can sausage, Libby, McNeill & Libby, Chicago, Ill.

One can sausage, G. H. Hammond Co., Chicago, Ill.

One can sausage, German-American Provision Co., Chicago, Ill.

Meat products put up in glass jars, which cannot in all cases be subjected satisfactorily to sterilization by heat, may contain preservatives added with the intention to preserve such products from decomposition while in the jar. One glass jar of so-called "chopped dried beef," manufactured by the Beechnut Packing Company of Canajoharie, N. Y., contained a boron preservative.

A microscopical examination was made of blocks of the contents of eighty-three samples for the purpose of determining the relative amounts of muscular tissue to other animal tissues, such

as fat, cartilage, salivary and other glands, lung, skin, hair, etc., and also to ascertain the presence or absence of vegetable elements, such as spices, corn meal or other cereals, and potato.

It hardly need be stated that potted or deviled meats in sealed cans or jars should consist chiefly of muscular tissue to be considered of high quality. The addition of cereals or vegetabl materials of any kind, other than spices, should be considered as adulteration. Sausages should consist of muscle fibre and fatty tissues and spices.

As to the so-called meat loaves, there would appear to be some question whether the presence of a cereal would constitute an adulteration, although there is nothing in the definition of the word "loaf" which would suggest that vegetable materials were called for, or permissible, as added ingredients to the meat used in their preparation.

In the description of the samples, and the report of the results, no attempt has been made to give comparative values between samples of the same class, except in so far as the statement of their contents and the amount of each ingredient would allow of such comparison. The tables at the end give a grouping of the samples according to the results obtained.

It may be said, however, that those preparations in which the muscular tissue constituted a very large part of the contents of the sample were usually freer from homogeneous or amorphous debris than were the preparations which contained less muscle fibre, and especially less than those in which muscle fibres were conspicuous by the scarcity. These latter products frequently contained considerable detritus. Such products are undoubtedly made from the poorest "trimmings" and other scraps.

In the descriptions of the samples which follow are included, under the name of the producer, the statements appearing on the labels concerning the nature of the contents of the cans or the conditions under which they were prepared. In most instances these have been abbreviated. Thus, the word "inspected," stands for various statements appearing upon labels to the effect that the meats contained in the can were inspected and passed by United States Government Inspectors in accordance with the act of Congress of March 3, 1891, relating to the inspection of meats.

The term "personally selected" indicates that the label bore the statement to the effect that the animals used in the preparation of the contents of the can had been selected under the personal supervision of some one, presumably that of the firm whose name appears on the label!

In order to determine the amount of undigestible material which was contained in the various samples, artificial pepsin hydrochloric acid digestion tests were resorted to. The material was treated with a pepsin solution in weak hydrochloric acid, and allowed to digest at body temperature for a given length of time; the material remaining undissolved, which would consist of cellulose, elastic tissue, hair, horn, etc., was weighed after the removal of the fat, and the amount calculated in per cent. of the dry substance. The percentage of fat is presented in the same manner.

The digestion tests were applied indiscriminately to those samples examined during the latter stages of the investigation; these were planned for the purpose of controlling or checking up the results of microscopic examination. A very fair degree of uniformity between the results of the two methods was obtained. The fat present in the samples submitted to this test is not included as insoluble residue, but its amount was estimated independently. This fat appeared in a variety of forms, and no attempt is made to interpret its significance.

When not expressly stated to the contrary, the test for boron preservative was negative.

Encysted embryos of *Trichina spiralis* were found in several sections of the contents of a sample of potted ham bearing the label of the Columbia Conserve Company of Indianapolis, Ind. A boron preservative was also present.

Luncheon Meat

Armour Canning Co., Chicago, Ill.

Two samples of this product bore labels with the following statement: "Fine Old English Luncheon Meat as Prepared at Haddon Hall in the Reign of Queen Elizabeth."

The contents of the two samples are similar in appearance,

both to the naked eye and microscopically, and consist of large amounts of fibrous tissues and fat, with scattered pieces of skin, glands, hair, and a little muscular tissue.

Roast Beef

Jacob Dold Canning Co., Buffalo, N. Y.

"Superior." "Quality Guaranteed."

Contents consist of pieces of reddish meat surrounded by a fatty gravy. Meat has a boiled appearance.

G. H. Hammond Co., Chicago.

"Coin Special." "Prime." "Quality Guaranteed." "Inspected."

Contents consist of a flat piece of lean meat, having a boiled appearance.

Libby, McNeill & Libby, Chicago, Ill.

"Prime." "Inspected." "Contents of Every Can Guaranteed." "Many tempting dishes may be made of this excellent meat."

Contents consist of about equal parts of pieces of lean meat, and of fatty and fibrous tissues. Meat has a boiled appearance.

Prairie State Packing Co., Chicago, Ill.

"Prize Winner."

Contents consist of rather fatty meat and fibrous tissue, having a boiled appearance.

Armour & Co., Chicago, Ill.

"Inspected." "Abattoir No. 2." Two samples examined.

Contents of the two cans consist of about equal parts of lean meat and fat, and fibrous tissue. Meat has a boiled appearance.

Six per cent. of the dried contents remained insoluble after peptic digestion.

Fairbanks Canning Co., Chicago, Ill.

"Extra Choice." "Best Roast Beef in the World." "Inspected."

Can contains reddish muscle in fair proportions, with fat and fibrous tissue. Meat has a boiled appearance.

Cudahy Canning Co.

"Rex Brand." "Abattoir No. 53."

Can contains considerable rather greenish-looking fat and reddish muscle in fair proportions with fat and fibrous tissue. Meat has a boiled appearance.

Corned Beef

Armour Packing Co., Kansas City.

"Helmet Brand."

The contents consist of masses of reddish muscle and considerable fat and fibrous tissue. About 4.5 per cent. of the dried substance remained as an insoluble residue after peptic digestion.

Fairbanks Canning Co., Chicago, Ill.

"Lion Brand." "Quality Guaranteed." "Factory No. 1."

The contents consist of pieces of fat and tendonous and fibrous material, and some lean meat. Seven per cent. of the dried contents remained as an insoluble residue after peptic digestion.

Libby, McNeill & Libby, Chicago, Ill.

"Cooked Corned Beef." "Guaranteed the Best." Sample A.

Contents consist of masses of cooked coarse fibred muscle, containing considerable fat.

"Cottage Beef." Sample B.

"Is a careful selection of high grade beef cured and cooked so as to impart a mild delicate flavor not obtained in ordinary corned beef."

Contents resemble ordinary corned beef of fair grade.

G. H. Hammond Co., Chicago, Ill.

"Coin Special." "Abattoir No. 11." "Inspected." Quality Guaranteed."

Contents consist of rather fatty masses of muscle and fibrous tissue.

Four per cent. of the dried contents remained as an insoluble residue after peptic digestion.

Cudahy Canning Co.

"Rex Brand." "First Quality." Two samples.

Contents consist of rather fatty masses of meat.

One sample contained a boron preservative.

Cincinnati Abattoir Co., Cincinnati, Ohio.

"Pheasant Brand." "Selected Quality." "Abattoir No. 65." "Inspected." "This beef is from Choice Kentucky Cattle."

Contents consist of masses of muscle without much fat. Can contains considerable meat jelly.

The digestion test of the dried material showed only 2.7 per cent. of insoluble residue.

German-American Provision Co., Chicago, Ill.

"Blue Ribbon Brand." "Absolutely Pure Food." "Inspected." "Abattoir No. 125."

Contents consist of rather fatty masses of muscle and fibrous tissues.

The digestion test of the dried material showed 4.7 per cent. of insoluble residue.

Morris & Co., Chicago, Ill.

"Lion Brand." "Yacht Club." "Factory No. 1." Two samples.

Contents of both consist of masses of muscle not very fatty in character.

The digestion test of the dried material showed 5 per cent. of insoluble residue.

Dried or Sliced Beef

Twelve samples of dried or sliced beef, bearing the labels of ten different concerns.

Three samples bore the label of the Beechnut Packing Company of Canajoharie, N. Y. Of these, one glass jar contained granular

masses, which on microscopic examination were found to consist of muscle fibre, but a boron preservative was present in the contents. The label bore the word "Chopped."

The other two glass jars contained slices of dried fatty muscle, and no preservatives.

One tin can, bearing the label of J. W. Beardsley Sons, New York city, which contained the following phrase: "This beef is sliced from pieces of the choicest beef hams and is always moist and of uniform delicacy," contained a boron preservative.

The other nine samples bore the labels of the following firms, and the contents consisted of slices of more or less lean muscle:

Manhattan Packing Co., New York.
Greater New York Packing Co., New York.
J. R. Smith & Co., "Shamrock Brand," New York.
Capital City Packing Co., Albany, N. Y.
Joseph Lyons, Albany, N. Y.
Cudahy Canning Co.
Oneonta Grocery Co., Oneonta, N. Y.
New England Supply Co., Providence, R. I.

Hamburger Steak

Libby, McNeill & Libby, Chicago, Ill.

"Inspected."

Contents consist of a rather fatty mass of chopped muscular tissue, having a strong odor of onions.

Lunch Tongue

Austin Nichols & Co., New York, N. Y.

"Friendship Brand." "Inspected." "Packed at Cincinnati, O." "Abattoir No. 142."

The sample consists of several rather small fatty tongues in a tin can lined with oiled paper.

The digestion test of the dried contents showed the presence of 16.4 per cent. of insoluble residue.

Cincinnati Abattoir Co., Cincinnati, Ohio.

"Pheasant Brand." "Abattoir No. 65." "Inspected." "Cured in open kettle sugar."

The sample consists of several rather fatty small tongues in a tin can lined with oiled paper.

Libby, McNeill & Libby, Chicago, Ill.

"Inspected." "Ox Tongues."

Contents consist of one large tongue and masses of coarse muscle.

Armour Packing Co., Kansas City, Mo.

"Inspected." Statement is made on the label that the "can was soldered on the outside without the use of acids."

On the inside of the cover of the can is a large mass of solder and a corresponding area of discoloration upon the medium sized tongue which composes the greater part of the contents. Considerable fat present.

Acker, Merrall & Condit, New York, N. Y.

"Amcehat." "Ox Tongue." "Abattoir No. 12."

The can lined with oiled paper contains two entire tongues of medium size. Considerable fat present.

Max Ams, New York, N. Y.

"Made from Best Materials." "Clean, Fresh and Wholesome."

Contents consist of two rather small tongues. Considerable fat present.

Lamb's Tongues

Morris & Co., Chicago.

"Cooked." "Lion Brand." "Always Perfect." "Superior Quality." "Factory No. 1."

Contents consist of pieces of cooked tongue and some fat.

G. H. Hammond Co., Chicago, Ill.

"Coin Special." "Appetizing and Satisfying." The reverse of the label bore the statement: "Received Sept. 18, 1905, Tripe Dept."

The contents of the glass jar with tightly sealed cover, consist of eight whole tongues surrounded by a pickling liquid.

Corned Beef Hash

Armour & Co., Chicago, Ill.

Contents consist of a large amount of potato, some muscular tissue and considerable fatty and fibrous tissues in good sized pieces.

Libby, McNeill & Libby, Chicago, Ill.

"Peerless Brand." "Inspected."

Contents consist of about equal quantities of potato and coarse fibred meat, with but little fatty or fibrous tissue.

Potted Beef

Franco-American Food Co., Jersey City Heights, N. J.

Contents of two cans appear to consist of finely minced meat. Upon microscopical examination is found to be almost entirely muscle fibres, with some spices.

Potted Tongue

Armour Packing Co., Kansas City.

"Helmet Brand." "No. 13." "Inspected."

Microscopical examination shows the presence of a little fibrous tissue, and a large amount of muscle fibre.

Armour & Co., Chicago, Ill.

"Veribest." "Inspected."

Contents appear to be of minced meat and considerable fat, with a strong odor of garlick.

Miscroscopical examination reveals a fair amount of muscle fibre, with considerable spice and cereal.

G. H. Hammond Co., Chicago.

"Coin Special." "Quality Guaranteed." "U. S. Inspected." "Abattoir No. 11."

Microscopical examination reveals almost no muscle fibre, a large amount of fibrous tissue and glands.

Eastmans. Packed at New York, N. Y.

"Extra Choice." "No. 10." "Inspected."

Contents consist of some muscular tissue, considerable fatty and fibrous tissues, including glands, with some spice.

Richardson & Robbins, Dover, Del.

This specimen consists of a fair amount of muscle fibre and considerable fibrous tissue, and some spice.

Fairbanks Canning Company.

"Lion Brand." "Personally Selected." "Inspected." "Quality Guaranteed."

The microscopical examination of this sample reveals a fair amount of muscle fibre, with considerable fibrous, fatty and gland tissues, with some spice.

Cudahy Canning Co., Omaha, Neb.

"Rex Brand." "First Quality." "Packed at South Omaha."

Microscopically the contents consist of a small amount of muscle fibre in comparison with the amount of fatty, fibrous and gland tissues.

Potted Ham

Armour Packing Co., Kansas City.

"Helmet Brand." "Inspected." "No. 13."

The microscopical examination reveals a fair amount of muscle and considerable amounts of fatty, fibrous and gland tissues, with some spice.

Curtice Brothers, Rochester, N. Y.

"Extra Quality."

The microscopical examination shows chiefly muscle fibres, with a little fatty tissue.

Fairbanks Canning Co.

"Lion Brand." "Factory No. 1." "Inspected." "Quality Guaranteed."

Examination shows a large amount of muscle fibre, some fatty, fibrous and gland tissues, with spices.

Columbia Conserve Co., Indianapolis, Ind.

The contents contain a boron preservative.

Examination reveals a fair amount of muscle fibre and considerable fibrous and fatty tissue, and sections of several trichinæ.

Richardson & Robbins, Dover, Del.

"First Quality."

On microscopic examination the sample is found to consist almost exclusively of muscular tissues; some spices.

The Cudahy Canning Co.

"The Taste Tells."

The contents of the can contain a boron preservative.

Examination reveals a very considerable amount of fibrous and fatty tissues, with a moderate amount of muscle; some spices.

Libby, McNeill & Libby, Chicago, Ill.

"Inspected."

Examination shows a fair amount of muscle fibre, with a small amount of fibrous tissue.

Armour Canning Co., Chicago.

"Inspected." "Abattoir No. 2."

Examination reveals a moderate amount of muscle, with considerable fibrous tissues and cereal.

G. H. Hammond & Co., Chicago, Ill.

"Coin Special." "Quality Guaranteed." "Abattoir No. 11."

Examination reveals a large amount of muscular tissue, with but little fibrous tissue; some spices.

German-American Provision Co., Chicago, Ill.

"Inspected." "Abattoir No. 125."

Examination reveals but little muscle and large amounts of fibrous tissue and cereal.

Deviled Ham

Armour & Co., Chicago, Ill.

"Veribest." "Inspected." Two samples.

One contains a boron preservative.

Examination shows considerable fatty, fibrous and gland tissues, and but little muscle; some cereal.

The digestion test of the dried contents showed 13 per cent. of insoluble residue after peptic digestion.

Fairbanks Canning Co.

"Lion Brand." "Factory No. 7."

Examination shows a fair amount of muscle fibre, with a moderate amount of fatty and fibrous tissues.

The digestion test of the dried contents showed 9.3 per cent. of insoluble residue.

Armour Canning Co., Chicago, Ill.

"Gold Medal, Paris, 1899." "First Quality." "Inspected."

Examination shows a fair amount of muscle fibre, with some fibrous tissue; considerable cereal.

The digestion test of the dried contents showed 6.6 per cent. of insoluble residue.

Cudahy Canning Co.

"Rex Brand." "The Taste Tells."

Examination shows a fair amount of muscle fibre, with a considerable amount of fibrous tissue and tissue débris.

Wm. Underwood Co., Boston, Mass.

Almost exclusively muscle fibres.

Libby, McNeill & Libby, Chicago, Ill.

"Inspected."

Examination shows considerable muscle fibre, with a very moderate amount of fibrous or fatty tissue, and some spices.

The digestion test of the dried material shows 5 per cent. of insoluble residue.

German-American Provision Co., Chicago.

"Inspected." "Abattoir No. 125."

Contains a boron preservative.

Examination shows but little muscle and a large amount of cereal and potato starch.

Sausage

Armour & Co., Chicago, Ill.

Four samples of sausage, two labeled "Luncheon Sausage," "Veribest," one labeled "English Luncheon Sausage with Tomato Sauce," and one designated "Vienna," "Veribest."

The contents of all the cans consist of ten or more sausages of small diameter, with cut ends, surrounded by a "sauce," except in the can marked "Vienna."

The contents of both cans of the so-called "Luncheon Sausage" contains a boron preservative. That of the other two cans does not.

On the labels of all the cans is the note that the meat contents had been inspected in accordance with the act of Congress, dated March 3, 1891, and also the words "Abattoir No. 2."

Microscopically the contents of the cans containing the preservatives consist of large amounts of fatty and fibrous tissues, with corn meal in the meshes, and a few scattered bundles of muscular tissue.

The "English Luncheon" and "Vienna" sausages are of similar composition, but the muscle fibres are more numerous.

The digestion experiments upon the dried contents show an average of 14 per cent. of insoluble residue in the "Luncheon Sausages" and of 8 per cent. in the "Vienna."

Libby, McNeill & Libby, Chicago, Ill.

Three samples of sausages, labeled "Vienna," "Wienerwurst" and "Vienna German Style" respectively. All labels bore the remarks "Contents of this package inspected under Act of March 3, 1891." "Factory 22."

The contents of the can designated "Weinerwurst" contains a boron preservative; the others do not.

Microscopically the three samples consist chiefly of fatty and fibrous tissues, with a small amount of muscular tissue.

Cudahy Canning Co.

"Rex Brand." "Luncheon Sausage with Tomato Sauce."

Contents contain a boron preservative.

Microscopically a small amount of muscular tissue and a large amount of fatty and fibrous tissues is found, together with some cereal.

The digestion test upon the dried contents shows 9.6 per cent. of insoluble residue.

G. H. Hammond Co., Chicago, Ill.

"Coin Special." "Vienna Sausage." "Abattoir No. 11." "The meat contained in this can is of superior quality, having been carefully selected under our personal supervision, and inspected according to law enacted by Congress March 3, 1891, regulating the inspection of meats." "Quality guaranteed."

The contents of this sample contains a boron preservative.

Microscopically the contents consists almost entirely of fatty and fibrous tissue and cereal, with but very few muscle fibres.

The digestion test on the dried sausages gave 8 per cent. of insoluble residue.

German-American Provision Co., Chicago, Ill.

"Blue Ribbon" Brand. Trade Mark E. "Absolutely Pure Food." "Inspected." "Official." "No. 125."

The contents contain a boron preservative.

Microscopically the contents consist of a fair amount of muscular tissue, with some fibrous and fatty tissues and cereal.

The digestion test on the dried material gives 13.3 per cent. of insoluble residue after pepsin digestion.

Gustave Amandus, Frankfurt A/Main, Germany.

"Frankfurter Brätwurst."

The contents do not respond to the tests for boron preservatives.

Microscopically the contents consist almost exclusively of fatty tissues, with but few bundles of muscle fibres and some spices.

Ersten Frankfurterwurstfabrik, Frankfurt A/Main, Germany.

"Frankfurte Brätwurstchen Conservirte." "Das Feinste vom Feinen." "Export nach allen Ländern." "The Delicatest of the Delicatest." "Le Nec Plus Ultra." "Handels Marke No. 7184."

The contents do not respond to the tests for boron preservatives.

Microscopically the sample consists almost exclusively of fatty and fibrous tissues, with but few bundles of muscle fibres.

Potted Chicken

Morris & Co., Chicago.

"Lion Brand." "Factory No. 1."

Examination shows only a moderate amount of muscle, with considerable fibrous tissue; some spices.

Richardson & Robbins, Dover, Del.

Examination shows a very large proportion of muscle fibre, with a little fibrous tissue.

Columbia Conserve Co., Indianapolis, Ind.

Two samples.

Examination of two samples shows the presence of considerable muscular tissues, with a moderate amount of fatty and fibrous tissue.

Aetna Brand, packed at Batavia, N. Y.

The examination shows a fair amount of muscle fibre, with a moderate amount of fibrous and fatty tissues.

Armour & Co., Chicago, Ill.

"Veribest."

Examination shows a fair amount of muscle, with considerable fatty and fibrous tissues.

Potted Chicken and Tongue

Armour Packing Co., Chicago.

"Star Brand."

Examination shows a moderate amount of muscle fibre, with much fibrous and fatty tissues.

Deviled Chicken

Schwarzchild, Sulzberger & Co., Chicago.

"Selected Chickens." "Finest Quality." Two samples.

Examination shows a fair amount of muscle fibre, with considerable fatty and fibrous tissue; some spices.

The digestion test of the dried sample contents showed 11 per cent. of insoluble residue.

Underwood Co., Boston, Mass.

"Absolute Purity Guaranteed."

Examination shows a very large amount of muscle fibre, with a little fibrous tissue.

The digestion test of the dried contents showed 4.7 per cent. of insoluble residue.

Potted Turkey

Morris & Company, Chicago.

"Lion Brand." "Superior Quality." "Approved by U. S. Government Inspectors."

Contains a fair amount of muscle fibre, a considerable amount of fibrous and fatty tissue, and some spices.

Columbia Conserve Co., Indianapolis.

Considerable muscle fibre, with a moderate amount of fatty and fibrous tissues, and some spices are found on microscopic examination.

Aetna Brand, Batavia, Genesee Co., N. Y.

Large amount of muscle fibre, with a little fatty and fibrous tissue, with spices.

Armour & Co., Chicago.

"Veribest."

Mixed with the contents of the can are several jet black, wiry pieces of hair resembling pig bristles. Microscopically the specimen shows a moderate amount of muscle fibre and considerable amounts of fatty and fibrous tissues, with some spices and a little cereal. Ten per cent. of the dried contents were not digested in the digestibility experiments.

Deviled Turkey

Schwarzchild, Sulzberger & Co.

"Advance Brand." "Finest Quality." Two samples examined.

Fair amount of muscle fibre, considerable fatty and fibrous tissues and granular débris, with a considerable amount of spice and

some cereal. The digestion experiment of the dried substance showed 10 per cent. of insoluble residue.

Underwood & Co., Boston, Mass.

Very large amount of muscle fibre and very little fibrous tissue; some spices. The digestion experiment showed but 3 per cent. of insoluble residue in the dried material.

Boned Turkey

Richardson & Robbins, Dover, Del.

Two samples.

Contents consist of pieces of light and dark meat of good appearance and not very fatty. A small amount of skin and a few pin-feathers are present.

Armour & Co., Chicago.

"Veribest."

Contents consist of pieces of light and dark muscle fibre and a moderate amount of liquid fat. Some pin-feathers present.

Potter & Wrightington, Boston, Mass.

"Superior Quality."

Contents consist of pieces of light and dark meat of good appearance and a small amount of thin, gravy-like liquid. No pin-feathers.

Austin Nichols & Co., New York.

"Republic" Brand.

Contents consist of light and dark muscle, with some few pieces of skin and bone.

Boned Chicken

Richardson & Robbins, Dover, Del.

"Extra Quality."

Contents of the two cans consist of pieces of light and dark muscle fibre, resembling chicken of good quality.

The digestion test of the dried material showed 4 per cent. of insoluble residue and 42 per cent. of fat.

Armour & Co., Chicago, Ill.

"Veribest."

Two cans contain pieces of light and dark muscle fibre, with a few pieces of skin containing pin-feathers.

The digestion test of the dried contents showed 5 per cent. of insoluble residue and 5 per cent. of fat.

Libby, McNeill & Libby, Chicago, Ill.

"Peerless." "Inspected." "Abattoir No. 22."

Contents of two cans consist of pieces and shreds of light and dark muscle fibre. No skin or pin-feathers found.

The digestion test of the dried material showed 8.9 per cent. of insoluble residue and 10 per cent. of fat.

Curtice Brothers Co., Rochester, N. Y.

"Blue Label." "Extra Quality."

Contents consist of light and dark muscular tissue in as large shreds and masses as could be obtained from fair sized chickens. But little fat present, and no bones or tendons. A little skin and a few pin-feathers are to be found.

Chicken Loaf

Armour & Co., Chicago.

"Veribest."

Microscopic examination demonstrates the presence of a fair amount of muscle fibre, considerable fibrous tissue, granular débris and cereal.

Libby, McNeil & Libby.

Factory 22. "Peerless" Brand. Statement made on label that the contents of the can had been "Inspected according to Act of Congress."

Contents consist of a small amount of muscle fibre and large amounts of fibrous and fatty tissues and cereal.

Veal Loaf

G. H. Hammond Company, Chicago.

Abattoir No. 11. Contents "Personally Selected." "Inspected."

In contents is found a stiff, black hair like a pig's bristle.

Microscopic examination shows but little muscle, a very large amount of fibrous tissue and tissue detritus, and a considerable amount of cereal.

Cudahy Canning Co.

"Rex Brand." "Inspected." "No. 19."

The digestion experiment showed the dried contents of the can to consist of 11.7 per cent. of insoluble residue.

Armour & Co., Chicago.

"Inspected." Abattoir No. 2.

Microscopic examination shows a moderate amount of muscle and a large amount of cereal and tissue débris and fat.

Nelson, Morris & Co.

"Lion" Brand. The label stated "The contents of this package is of superior quality, having been carefully selected under our personal supervision, and inspected according to law enacted by Congress, March 3, 1891, regulating the inspection of meats."

In the contents are found eight short pieces of black hairs resembling pigs' bristles.

This specimen consists chiefly of fatty and fibrous tissues, including cartilage and some cereal. An occasional small bundle of muscle fibres can be found.

Libby, McNeil & Libby, Chicago.

"The Best." "Inspected, etc." "Factory 22." Two samples.

The contents consist of some muscle fibres and a very considerable amount of fibrous and fatty tissues and cereal.

German-American Provision Co., Chicago.

"Blue Ribbon Special." "Trade Mark E." "Absolutely Pure Food."

The digestion experiment on the dried contents of this sample showed 9.5 per cent. of insoluble residue.

Ham Loaf

G. H. Hammond Co., Chicago.

"Coin Special." "Inspected." "Selected under Personal Supervision."

Sample contains a fair amount of muscle fibre, with considerable fibrous and fatty tissues and cereal.

Libby, McNeil & Libby.

"The Best." "Peerless."

Examination of samples from both cans shows the presence of some muscle fibres, a very considerable amount of fibrous and fatty tissues and a large amount of cereal.

Armour & Co., Chicago.

"Inspected."

Sample consists of some muscle fibres, considerable fatty and fibrous tissues and considerable cereal.

Cudahy Canning Co.

"Rex Brand." "Inspected according to Act of Congress."

Sample contains a boron preservative. It consists chiefly of cereal and fatty and fibrous tissues, with a few muscle fibres.

Armour Packing Co., Kansas City.

"Helmet Brand." "Inspected." "No. 13."

Contents consist of a considerable amount of muscle fibre, with a moderate amount of fibrous tissues and some spices.

Beef Loaf

Armour & Co., Chicago.

"Veribest." "Inspected." "Abattoir No. 2."

Sample consists of a considerable amount of muscular tissue, with a small amount of fibrous elements and cereal, with some spices.

The digestion experiment showed the presence of 6.7 per cent. of insoluble residue in the dried sample contents.

Chicken Liver Pâté Truffled

Franco-American Food Co., Jersey City Heights, N. J.

Contents microscopically consist of crushed liver with truffles.

Chicken Pâté

Franco-American Food Co., Jersey City Heights, N. J.

Contents microscopically consist of masses of muscular tissue and truffles.

Wild Duck Pâté Truffled

Franco-American Food Co., Jersey City Heights, N. J.

Contents consist of masses of muscular tissue, considerable fibrous tissues, with some liver and truffles.

Potted Game

Mullen, Blackledge Co., Indianapolis, Ind.

"Columbia Brand."

Microscopic examination shows the presence of slightly more muscle fibre and fatty tissue than cereal.

The dried contents contained about 10 per cent. of insoluble residue after digestion.

Chicken Tamale

Armour Packing Co., Kansas City, Mo.

"Helmet Brand." "Inspected." "No. 13."

Contents consist of corn husks containing a mixture of a white pasty material, enclosing a mass of red granular and somewhat fibrous material. The contents did not lend themselves to a satisfactory microscopic examination.

The dried contents, exclusive of the corn husks, contained over 17 per cent. of insoluble residue after digestion with pepsin.

Curried Fowl

Richardson & Robbins, Dover, Del.

"Superior."

Contents consist of pieces of fowl, such as the back, wing, second joint, with some skin and pinfeathers, mixed with a thin dressing.

Microscopically the preparation showed a normal relation of muscle fibres to fibrous tissues, with some curry and spice.

Boneless Pigs Feet

Nelson Morris & Co., Chicago, Ill.

"Supreme Brand." "Spiced."

The contents appear to be made up of masses of pickled skin, subcutaneous tissues and tendons.

The digestion test of the dried material shows the presence of 6.3 per cent. of insoluable residue after peptic digestion, and 35 per cent. of fat.

Max Ams, New York, N. Y.

"Made from Best Materials." "Clean, Fresh and Wholesome."

The contents appear like the above sample.

Microscopically the contents consist of fibrous and fatty tissues, with a small amount of muscle.

The digestion test of the dried contents shows 6.9 per cent. of insoluble residue and 31 per cent. of fat.

Veal Cutlets

Armour & Co., Chicago, Ill.

"Country Club." "Inspected." "Abattoir No. 2."

Contents appear to consist of two cutlets and a thin potato dressing.

The digestion test on the dried material shows the presence of 7.4 per cent. of insoluble residue and 11 per cent. of fat.

Macedoine Stew

Armour & Co., Chicago.

"Country Club." "Inspected." "Abattoir No. 2."

Contents appear to consist of rectangular pieces of muscle of coarse fibre, with a thin dressing containing peas.

The digestion test on the dried material shows the presence of 8.9 per cent. of insoluble residue and 31 per cent. of fat.

Melrose Pâté

Libby, McNeil & Libby, Chicago, Ill.

"A delicious preparation of Chicken, Veal and Ham."

Microscopic examination shows it to consist largely of muscular tissue, and a small amount of cereal and some spices.

The digestion test of the dried material shows it to contain 7.8 per cent. of insoluble residue and 26 per cent. of fat.

Beef Burgundy Style

Franco-American Food Co., Jersey City Heights, N. J.

"French Entree."

Contents consist of rectangular masses of coarse fibred meat, slices of potato and onion.

The digestion test of the dried material shows the presence of 9.2 per cent. of insoluble residue and 23 per cent. of fat.

Chili Con Carne

Armour Packing Co., Kansas City.

"Helmet Brand."

The contents appear to be made up of a thin gravy, containing beans, tomatoes, and other vegetables. The presence of meat cannot be made out. Extremely pungent to the taste.

The digestion test of the dried material shows the presence of 22.5 per cent. of insoluble residue and 16 per cent. of fat.

This specimen did not lend itself to satisfactory microscopic examination.

Cottage Head Cheese

Libby, McNeill & Libby, Chicago, Ill.

"Home Made."

Contents appear to consist of muscle and fat, together with pieces of skin, bones and hairs.

Microscopic examination shows a large amount of fatty muscular tissue.

The digestion test of the dried contents shows only 3.6 per cent. of insoluble residue and 22.6 per cent. of fat.

Hog and Hominy

Armour & Co., Chicago, Ill.

"With Tomato Sauce." "Inspected." "Abattoir No. 2."

Prolonged microscopic examination fails to reveal any muscle fibres whatever.

Contents consists of fatty tissues and corn meal, chiefly the latter.

Sliced Bacon

Beechnut Packing Co., Canajoharie, N. Y.

"Beechnut Brand."

Contents of glass jar consist of slices of fatty muscular tissue.

Tests for boron preservatives negative.

Armour & Co., Chicago, Ill.

"Star Brand."

Contents of tin can consist of thin slices of very fatty muscular tissue wrapped in paper.

Tests for preservatives negative.

Green Turtle Meat

Tangier Packing Co., Crisfield, Md.

"Tangier" Brand. "First Quality."

Contents appear to consist of the tissues of "turtle" floating in a thin gravy.

Microscopically the contents consist of a considerable amount of pigmented fibrous tissue, with some muscle fibres.

The digestion test of the dried contents showed 12 per cent of insoluble residue and 13 per cent. of fat.

Deviled Crab Meat

Tangier Packing Co., Crisfield, Md.

Contents consist of small masses of pink-white muscular tissues.

Microscopically it appears to consist entirely of muscle fibres.

Lobster

Henry L. Forham, Richmond, Cumberland Co., Me.

"Packed in Canada, J. J. & N. R. 678."

Contents consist of pieces of what is undoubtedly lobster wrapped in oiled paper.

Salmon

Pacific Packing and Navigation Co., Seattle, Wash.
"Choice Red Alaska." "Halcyon Brand."
Contents have the usual appearance of canned salmon.
Tests for boron preservatives negative.

Mince Meat

Merrell-Soule Co., Syracuse, N. Y.
"None Such" Brand.

H. C. Gutchess, Port Byron, N. Y.
"Imperial" Brand.

H. A. Dougherty, Port Byron, N. Y.
"Superior" Brand.

These samples did not lend themselves to satisfactory microscopic examination. All appeared to be mince meats of good quality.

Tests for boron preservatives negative.

The following tables have been prepared in order to group the samples according to their relative quality as determined by the various methods of examination, but without giving consideration to the presence or absence of boron preservatives.

It is noteworthy that of the 14 samples containing boron preservatives 11 belonged in the poorer grades as determined by the other methods of examination.

Further subdivisions of the groups could be readily made, but the details have already been given under each sample.

In the grouping the presence of vegetable materials other than spices or flavoring elements has been one of the detrimental factors, unless the label distinctly called for their presence, as would be the case of potato in hash or in stew.

Another of the chief determining factors has been the amount of actual muscle fibre found to be present.

Preparations With High Grade Meat Contents

Two jars sliced dried beef, Beechnut Packing Co., Canajoharie, N. Y.

One jar sliced dried beef, Manhattan Packing Co., New York, N. Y.

One jar sliced dried beef, Greater New York Packing Co., New York, N. Y.

One jar sliced dried beef, J. R. Smith Co., New York, N. Y.

One jar sliced dried beef, Capitol City Packing Co., Albany, N. Y.

One jar sliced dried beef, Joseph Lyons, Albany, N. Y.

One jar sliced dried beef, Cudahy Canning Co.

One jar sliced dried beef, Oneonta Grocery Co., Oneonta, N. Y.

One jar sliced dried beef, New England Supply Co., Providence, R. I.

One jar lambs' tongues, G. H. Hammond Co., Chicago Ill.

One can potted tongue, Armour Packing Co., Kansas City.

One can lunch ham (potted), Curtice Bros., Rochester. N. Y.

One can potted ham, Richardson & Robbins, Dover, Del.

One can potted ham, G. H. Hammond & Co., Chicago, Ill.

One can deviled ham, Wm. Underwood & Co., Boston, Mass.

One can potted chicken, Richardson & Robbins, Dover, Del.

One can deviled chicken, Underwood & Co., Boston, Mass.

One can deviled turkey, Underwood & Co., Boston, Mass.

One can chicken liver pâté, truffled, Franco-American Food Co., Jersey City, N. J.

One can chicken pâté, Franco-American Food Co., Jersey City, N. J.

One can deviled crab meat, Tangier Packing Co., Crisfield, Md.

One can lobster, Henry L. Forham, Richmond, Me.

Preparations With Good Grade Meat Contents

One jar dried beef (chopped), Beechnut Packing Co., Canajoharie, N. Y.

One can roast beef, Jacob Dold Canning Co. Buffalo, N. Y.

One can roast beef, G. H. Hammond Co., Chicago, Ill.

One can roast beef, Fairbanks Canning Co., Chicago, Ill.

One can roast beef, Cudahy Canning Co., Chicago, Ill.
One can corned beef, Armour Packing Co., Kansas City.
One can corned beef, Libby, McNeill & Libby, Chicago, Ill.
One can cottage beef, Libby, McNeill & Libby, Chicago, Ill.
One can corned beef, G. H. Hammond Co., Chicago, Ill.
One can corned beef, Cudahy Canning Co.
One can corned beef, Cincinnati Abattoir Co., Cincinnati, Ohio.
One can corned beef, German-American Provision Co., Chicago, Ill.
Two cans corned beef, Morris & Co., Chicago, Ill.
One can hamburger steak, Libby, McNeill & Libby, Chicago, Ill.
One can tongues, Austin Nichols & Co., New York.
One can tongues, Cincinnati Abattoir Co., Cincinnati, Ohio.
One can tongues, Libby, McNeill & Libby, Chicago, Ill.
One can tongues, Armour Packing Co., Kansas City.
One can tongues, Acker, Merrall & Condit, New York.
One can tongues, Max Ams, New York.
One can lambs' tongues, Morris & Co., Chicago, Ill.
One can corned beef hash, Armour & Co., Chicago, Ill.
One can corned beef hash, Libby, McNeill & Libby, Chicago, Ill.
Two cans potted beef, Franco-American Food Co., Jersey City, N. J.
One can potted ham, Fairbanks Canning Co.
One can potted ham, Libby, McNeill & Libby, Chicago, Ill.
One can deviled ham, Libby,McNeill & Libby, Chicago, Ill.
Two cans potted chicken, Columbia Conserve Co., Indianapolis, Ind.
One can potted chicken, Ætna Brand, Batavia, N. Y.
One can potted turkey, Columbia Conserve Co., Indianapolis, Ind.
One can potted turkey, Ætna Brand, Batavia, N. Y.
Two cans boned turkey, Richardson & Robbins, Dover, Del.
One can boned turkey, Armour & Co., Chicago, Ill.
One can boned turkey, Potter Wrightington, Boston, Mass.
One can boneless turkey, Austin Nichols & Co., New York, N. Y.
One can boned chicken, Curtice Bros., Rochester, N. Y.
Two cans boned chicken, Armour & Co., Chicago, Ill.
Two cans boned chicken, Libby, McNeill & Libby, Chicago, Ill.

Two cans boned chicken, Richardson & Robbins, Dover, Del.

One can ham loaf, Armour Packing Co., Kansas City.

One can beef loaf, Armour & Co., Chicago.

One can wild duck pâtés, truffled, Franco-American Food Co., Jersey City, N. J.

One can chicken tamale, Armour Packing Co., Kansas City, Mo.

One can curried fowl, Richardson & Robbins, Dover, Del.

One can boneless pigs feet, Max Ams, New York.

One can boneless pigs feet, Nelson Morris & Co , Chicago, Ill.

One can veal cutlets, Armour & Co., Chicago, Ill.

One can Macedoine stew, Armour & Co., Chicago, Ill.

One can Melrose pâté, Libby, McNeill & Libby, Chicago, Ill.

One can beef Burgundy style, Franco-American Food Co., Jersey City, N. J.

One can cottage head cheese, Libby, McNeill & Libby, Chicago, Ill.

One jar sliced bacon, Beechnut Packing Co., Canajoharie, N.Y.

One can sliced bacon, Armour & Co., Chicago, Ill.

One can green turtle meat, Tangier Packing Co., Crisfield, Md.

One can salmon, Pacific Packing & Transportation Co., Seattle, Wash.

One package mince meat, Merrell-Soule Co., Syracuse, N. Y.

One package mince meat, H. C. Gutchess, Port Byron, N. Y.

One package mince meat, H. A. Dougherty, Port Byron, N. Y.

Preparations with Only Fair Meat Contents

One can roast beef, Libby, McNeill & Libby, Chicago, Ill.

One can roast beef, Prairie State Packing Co., Chicago, Ill.

Two cans roast beef, Armour & Co., Chicago, Ill.

One can corned beef, Fairbanks Canning Co., Chicago, Ill.

One can corned beef, Cudahy Canning Co.

One can potted ox tongue, Armour & Co., Chicago, Ill.

One can potted tongue, Eastman, New York.

One can potted tongue, Richardson & Robbins, Dover, Del.

One can potted tongue, Fairbanks Canning Co.

One can potted ham, Armour Packing Co., Kansas City.

One can deviled ham, Fairbanks Canning Co.

One can deviled ham, Cudahy Canning Co.

One can sausage (English Luncheon), Armour & Co., Chicago, Ill.

One can sausage (Vienna), Armour & Co., Chicago, Ill.

Three cans sausage, Libby, McNeill & Libby.

One can frankfurters, Gustave Amandus, Frankfort, Germany.

One can frankfurters, Ersten Frankfurter Fabrik, Frankfort, Germany.

One can potted chicken, Morris & Co., Chicago, Ill.

One can potted chicken, Armour & Co., Chicago, Ill.

One can potted chicken and tongue, Armour Canning Co., Chicago, Ill.

Two cans deviled chicken, Schwarzschild, Sulzberger & Co., Chicago, Ill.

One can potted turkey, Morris & Co., Chicago, Ill.

One can potted turkey, Armour & Co., Chicago, Ill.

One can deviled turkey, Schwarzchild, Sulzberger & Co., Chicago, Ill.

One can chicken loaf, Armour & Co., Chicago, Ill.

One can chili con carne, Armour Packing Co., Kansas City.

Preparations with Low Grade Meat Contents

One can potted tongue, G. H. Hammond Co., Chicago, Ill.

One can potted tongue, Cudahy Canning Co., South Omaha.

One can potted ham, Cudahy Canning Co., South Omaha.

One can potted ham, Armour Canning Co., Chicago, Ill.

One can potted ham, German-American Provision Co., Chicago, Ill.

Two cans deviled ham, Armour & Co., Chicago, Ill.

One can deviled ham, Armour Canning Co., Chicago, Ill.

Two cans sausage (Luncheon), Armour & Co., Chicago, Ill.

One can sausage (Lunch), Cudahy Canning Co., Chicago, Ill.

One can sausage, G. H. Hammond Co., Chicago, Ill.

One can sausage (Vienna), German-American Provision Co., Chicago, Ill.

One can chicken loaf, Libby, McNeill & Libby.

One can veal loaf, G. H. Hammond Co., Chicago, Ill.

One can veal loaf, Cudahy Canning Co., Chicago, Ill.

One can veal loaf, Armour & Co., Chicago, Ill.

Two cans veal loaf, Libby, McNeill & Libby, Chicago, Ill.

One can veal loaf, German-American Provision Co., Chicago, Ill.

One can ham loaf, G. H. Hammond Co.

Two cans ham loaf, Libby, McNeill & Libby.

One can ham loaf, Armour & Co., Chicago, Ill.

One can potted game, Mullen, Blackledge Co., Indianapolis, Ind.

Preparations with Very Poor Meat Contents

Two cans luncheon meat, Armour Canning Co., Chicago, Ill.

One can dried beef, J. W. Beardsley & Sons, New York city.

One can deviled ham, German-American Provision Co., Chicago, Ill.

One can veal loaf, Nelson Morris & Co.

One can ham loaf, Cudahy Canning Co.

One can hog and hominy, Armour & Co., Chicago, Ill.

Preparations Made from Diseased Meat

One can potted ham, Columbia Conserve Co., Indianapolis, Ind.

The source of the meat used in preparation of the can of potted ham in which embryos of the *Trichina spiralis* were found is, of course, unknown to us. That it is not an uncommon custom for establishments packing certain lines of products to purchase other products, such as beef or pork by the barrel, and to pack the same in cans, or make the same into sausages, is shown by the evidence which has recently been submitted to us by Dr. H. B. Wright, health officer of Skaneateles, N. Y., concerning an epidemic of trichinosis which occurred in the citizens of that place in November, 1906.

On December 22d Dr. Wright wrote to the Department in part as follows:

"About a month ago a number of cases of a somewhat peculiar nature appeared, which was causing a great deal of trouble to our

local physicians. On careful investigation, it was found that in every case the patient had been eating sausage from one of our markets. On inquiry of the market man, I found he had been purchasing some western shoulders and trimmings from Chicago and mixing it with some of his home-grown pork to make his sausages.

On close investigation I find that he was selling other portions of his home-grown pork in the shape of chops, etc., and no trouble arose from it, and only those who had partaken of the sausage were infected."

Dr. Wright stated that blood examinations of the patients had shown marked eosinophiles, and that microscopic examinations of pieces of muscle removed from several patients showed the presence of early embryos of *Trichina spiralis.*

In reply to this letter we wrote at once asking, amongst other items of information, for specimens of the "sausages," "western trimmings," "home grown pork" and "patients' muscle" referred to, and to have them sent to the State Hygienic Laboratory in properly sealed containers.

Dr. Wright replied on December 28, 1906, that he was unable to obtain any of the "sausages," "western trimmings" or "home grown pork," which he had previously written about, although he stated that he had "scoured the village to procure some specimens." He stated, however, that blood examinations had been made in over forty cases of illness similar in character to that in six cases, the histories of which he sent to us, and that these blood examinations had revealed marked leucocytoses and eosinophiles. These results certainly tend to confirm the clinical diagnosis of trichinosis in these cases.

Dr. Wright states in a later communication that the cases numbered not less than forty-five, and that he believes there were many patients who did not call in a physician and thus escaped examination.

The following is one of the histories sent to us by Dr. Wright, which gives a clear picture of the disease as shown by all six histories.

Patient, "L. W." Residence, "Skaneateles, N. Y."
Date of eating sausages, "uncertain."

Sausages eaten: "Mixture of home-grown and Chicago pork trimmings made up in Skaneateles."

Date of onset of first symptoms: "About Nov. 11, 1906."

Course of disease with symptoms, temperature, pulse, pain in bowels, etc.: "Diarrhoea, nausea, pain in abdomen, fever up to 104°. for 7 to 10 days, swelling of face, hands and feet, marked cyanosis and prostration, and muscle pains and stiffness."

Date and results of blood examination: "December 1, 1906." "Differential count of white blood corpuscles shows 45.6 per cent. eosinophiles."

Date and results of muscle examination: "December 26, 1906." "Muscle removed from biceps showed embryo trichinæ."

This history was signed by Dr. George Edward Clark, as well as were those of two other patients.

Dr. Wright further furnished us with the names of three prominent Chicago packing concerns who he stated had at various times supplied pork to the local butcher who had made the sausages, but he stated that sufficient data was not available to show which firm or firms had sent the butcher the diseased meat.

Upon the completion of the addition to the Antitoxin Laboratory, laboratory departments for the chemical and bacteriological examination of samples of water sent in or collected for sanitary analysis and for the examination of foods and drugs and the bacteriological diagnostic work, were fitted up in a satisfactory manner.

Water Examinations

Considerable time was spent in the months of November and December in formulating, procuring and arranging the necessary water sample outfits and plans for the conduct of this work in the future. Special efforts were made by the Sanitary Chemist to obtain all the available data relating to the past and present condition of the public water supplies of the municipalities of the State and especially the results of previous sanitary analyses.

A special examination of the filtration system of the Rome Custodial Asylum was made by Mr. Wachter.

He visited the plant on November 20th and thoroughly investigated the same, and upon his return made the following report:

"In reference to the Rome Asylum filter plant which I inspected and have since been considering, would say that the conditions are such that the present plant cannot do the most satisfactory work.

The sample of sand taken from the filter is decidedly too coarse for high efficiency.

The pressure gauge on the raw water indicated one-pound pressure. This low pressure makes it impossible to use a sand fine enough to do good work, as the resistance would be more than the water pressure could overcome.

Charcoal as a filtering material is of questionable value as it soon becomes clogged with filth which the ordinary washing of the filter does not remove.

I have considered the feasibility of converting the present filters into gravity filters, using a coagulant and do not recommend it as the most satisfactory scheme. The changes necessary are so radical that there would be very little left of the original plant.

The units are small and rate controllers, etc., are difficult to procure as stock articles for such small units.

Being two of them it means a duplication of all valves, fittings and controllers, which would not be necessary if a single unit of equivalent capacity were installed.

Though the initial cost might be somewhat more the replacement of the present plant with a single unit gravity filter built according to the prevailing best practice would be more satisfactory and efficient."

Mr. Wachter informed me that he had gone into the matter with considerable care and had consulted dealers in controlling apparatus and his conclusion as given was fully warranted.

I did not believe it was feasible for Mr. Wachter to go into the details of the cost of a new filtering system.

Typhoid Fever

The director of the laboratory investigated, during the year, the occurrence of typhoid fever in the following municipalities in the State:

Fort Edward, Whitehall, Castleton, Wellsville and Solvay.

The full details of these investigations will appear in the report of the Division of Communicable Diseases. The investigation of such outbreaks by those familiar with bacteriological laboratory work aids much in the application of the laboratory knowledge to executive problems. Two of the outbreaks in Whitehall and Wellsville were directly due to polluted public water supplies. That of Whitehall is apparently subject to continuous pollution while that of Wellsville is ordinarily quite free from any pollution whatever.

The outbreak in Fort Edward was not studied thoroughly, as it was not recent at the time attention was called to it. It was possibly due to a contaminated public water supply. On the other hand the outbreak at Solvay was probably due to an infected milk supply and that at Castleton was certainly due to the agency of flies, which had had access to the discharges of a case of typhoid fever.

Bacteriological Diagnosis

This work has remained in the hands of the staff of the Bender Laboratory. There are numerous evidences indicative that it could be made of far greater service to the health officers and physicians of the State, and therefore to the Department. This work fulfills two purposes. It can aid the physician greatly in the diagnosis of the cases under his care, and it gives the Department definite information of the most reliable character, of the existence of those diseases to which our present science permits it to be applicable. To obtain the latter the work must accomplish the former purpose. The greatest drawback to this work by the State Laboratory is the time taken in the transportation of the specimens, and in the return of the reports by mail.

As soon as appropriations permit, many desirable changes should be made in this field of work. New outfits for the diphtheria diagnosis work should be worked out. The diphtheria cultures should not be allowed to remain in the Albany postoffice

ing and supervising power for the benefit and the good of the county or small municipal laboratories; and above all else it should be the final recipient of the reports of all their work in order that these results may be correlated and studied for the benefit of the people of the State. However, the State Laboratory should be in a position to contribute toward the work of the smaller laboratories such knowledge, apparatus, supplies, report blanks, as are required in the work of sending reports to the central State Laboratory and should in every way fill out the needs of such a local laboratory when it can do so on a far more economical basis than the local laboratory. When such a system can be placed in operation then public health work in the rural districts will begin to rest on a scientific foundation.

The Legislature might well consider the enactment of a law granting permission generally for the establishment of a laboratory for each county, or for a group of counties, but such an enactment should provide for the general supervision of such work by the Hygienic Laboratory of the State Department of Health.

It can be said without exaggeration that with the establishment of the State Hygienic Laboratory lies the beginning of a new and powerful influence for the protection of the public health.

Respectfully submitted,

HERBERT D. PEASE,
Director State Hygienic Laboratory

February 1, 1907.

APPENDIX STATE HYGIENIC LABORATORY

APPENDIX STATE HYGIENIC LABORATORY

To Eugene H. Porter, M. D., *The Honorable Commissioner of Health:*

In submitting to you my report for the year 1906, of the experimental station, established at Saratoga, for the study of sewage, I am of the belief that a review in detail of the condition which the Saratoga commissioners had to meet, when the plant here was installed, will be a source of information to yourself, and the Committee that may determine the funds for its continuance. I make this extended review, because I believe that the work that can be done here at our experimental station is of such moment that the conclusions reached will be of value to the entire State, and will prove to be information absolutely necessary for every municipality that has a sewage disposal plant to install. We have barely commenced work at our laboratory; for, as you know, its installation was beset with many complications; and so it is impossible to give you at this time exact information for a report that would be of practical value to a layman, or really allow you to draw your deductions.

The history of Saratoga's plant commenced when the riparian owners along the creek into which the sewage from Saratoga Springs was being discharged, appealed directly to the Governor of the State, requesting an abatement of the nuisance incident to the pollution of the waters of the stream by our village sewage. The Governor directed that an investigation be made of the conditions, and a report made to him. This was done, and as a consequence, he enjoined our village from further use of the stream for this purpose, giving our village one year in which to abate the nuisance. This action or conclusion of the State's Executive, precipated many law suits for damages against our village. They were tried and carried to the Court of Appeals, the village was defeated, and was forced to pay hundreds of dollars for such damages.

The village at once caused an enactment to be passed, creating a sewer commission, and providing the necessary funds for the establishing of a sewage disposal plant. At this time, the village was emptying between five and seven million gallons of sewage daily into the creek, which was an abnormal quantity for a village of 13,000 people. The Saratoga Sewer Commission took office early in the year 1899 and commenced the work for which it was created. Many perplexing conditions presented themselves. I shall endeavor to review them as concisely as is consistent with clearness.

Preliminary investigating work was begun at once and continued during the summer of 1899, with the object of obtaining data that would enable the commissioners to decide on some plan that would be suitable for our requirements. A report followed which showed that we were using an unnatural amount of tap water, daily consumption of which was about 400 gallons per capita, all of which found its way into our sewers. This was due to the fact that the water was allowed to run from one or two faucets in nearly every house during the cold season, to protect the plumbing. The report further showed that the distributing pipes or mains in the streets were, in many instances, so near the surface, that they were within the frost zone, and must be protected from freezing, either by being relaid to a proper depth, or by the wasting of water by the village to keep circulation in the dead ends.

The report also showed that our sewage system was a mixed one, that is, it had been designed to carry the village sewage, surface and roof water, and in certain localities, ground water. That, further, because of the situation of our village (on two sides of a ravine with macadamized streets) the amount of water thrown into the valley at certain times of the year was enormous. It is estimated that as high as 30,000,000 gallons of water would be thrown into the valley in an hour during a heavy shower in summer, or at times in the winter when a heavy rain and thaw would occur. At such times it was impossible for the trunk sewer and village brook to carry off this enormous quantity of surface water and sewage as rapidly as necessary, and it would back or

dam the entire length of the valley, completely flooding our roadbeds and walks in that locality.

To overcome the waste of tap water, we placed about 2,500 meters, at a cost of $30,000, which reduced the daily consumption of water to a trifle over 100 gallons per capita.

To overcome the other serious obstacles in our local conditions, and reduce our sewage to a normal quantity, it was necessary to remove the storm, surface tap and seepage water from our sewers. So a trunk sewer was built the entire length of the valley, approximately 1½ miles, and many miles of laterals were rebuilt where seepage was particularly free. The original trunk sewer, 3½ ft. in diameter, was converted into a water carrier, to assist in carrying storm water, thus relieving the village brook in a measure. We also constructed several miles of water carriers, and about 100 catch basins, to take up the storm and surface water and deliver it in the regular water course, at a point beyond the usual engorgement at the time of heavy storms. The cost of these procedures was $40,000.

An additional advantage was gained in this way, as the surface water was collected at so many points and carried to the valley, that our streets were not torn up by the force of the surface water, which formerly would reach such a volume of force that whole blocks of our roads would be washed out and cause annually an item of great expense.

The third problem which confronted us, and really the anxious one, had now to be decided, i. e., the method of sewage disposal we would adopt or install. We were a long time reaching a decision, and during this interval consulted several sanitary experts. We considered broad irrigation, chemical precipitation, sand filtration, and contact beds; we visited many disposal plants, including those of Brocton, Framingham, Natic, and the experimental station at Lawrence, Mass., and the chemical precipitation plant at Brooklyn.

As a result of these observations and interviews, several conclusions were forced upon us:

1. That we must decide for ourselves as to the probable success of any method adopted as the whole subject was unsettled and in a chaotic condition, as there were only few disposal plants in

operation, and we did not find a sanitary expert who seemed sure just what could be done with our proposition, or would they do other than approve of Mr. Barbour's scheme in a general way. In fact we did not obtain from this source anything more definite than a resumé of the sanitary situation, suggesting as to possibilities, but always devoid of definite advice or information.

2. That the maintenance of the plant must be carefully considered; and while this feature made chemical precipitation prohibitive, it might also prove burdensome to our village if other methods were adopted.

3. That some method free from local nuisance must be determined upon that would give us a potable effluent, that being the requirement of the State Department of Health.

4. That the disposal of the sludge or solid portion of the sewage, practically and economically, was the element of uncertainty and the one on which sanitary engineers were not a unit.

5. That there were several sand filter plants working successfully in different sections of the United States, though the cost of maintenance was high, owing to the constant care of the surface of the filters, and the removal of the deposited solids or sludge from their surface.

We first decided upon an intermittent sand filtration scheme. Later, our engineer, Mr. Barbour, advised us to install a combination or mixed system of disposal, i. e., to first submit the sewage to septic or bacterial action in tanks, the effluent from the tanks to be subjected to aeration and the whole to be a preliminary treatment before the sewage reached the sand filters; this method, after much discussion and consideration, we finally adopted.

If an intermittent sand filtration plant is to be established, and the sewage is not to receive preliminary treatment, the maintenance of the surface, the clogging of the sand in the beds, and local nuisances, must all be considered — though the method is certain to give an acceptable effluent, if proper material of sufficient depth is obtainable. As has been stated, it is the suspended solids, or sludge, which clog the surface of the filter and make local nuisance. This deposit of course has to be removed continually from the surface of the beds, and is a large part of the cost of maintaining such a disposal plant. The preliminary

treatment of the sewage in tanks, followed by aeration, as suggested, is a practical way in which to dispose of a portion of the solids.

If this is to be accomplished, careful thought must be given to the construction of the septic tanks and aerating apparatus; the former that the bacteria can exist under the most favorable conditions, and when so arranged, we are sure of good results (when treating normal family sewage). But if it is ignorantly or carelessly planned, the results will be disappointing and unsatisfactory. The old time cess-pool is an ideal illustration of this fact. As a matter of history, when cess-pools were plenty, it was a common occurrence to find one that was used continuously and from which the sludge was never removed and it would go on thus indefinitely; while a neighboring one, under apparently the same conditions, was continually being filled up necessitating the removal of the sludge or solids. The explanation is simple; in the latter the arrangement was such that bacterial action was inhibited. It is a proven fact that when bacteria are given a proper home and proper environment they will so alter sewage that a potable effluent results. I grant this result is not common, but it is possible. To quote Dr. Amyot in this particular "if we can and do harness these bacteria up properly, they will work constantly and successfully for us in this field."

Bacterial action is more rapid in fresh than in putrid sewage; in a septic tank anerobic bacteria under proper conditions will do 40 per cent. of the work they are capable of doing in twenty-four hours and it might take a month for them to decompose the remaining 60 per cent. This is equally true of the aerobic bacteria.

After having determined on our scheme for the disposal of sewages, we had next to decide on the capacity necessary for our village. Owing to a large summer population a plant had to be constructed with a capacity equal to a city of 50,000 people.

It now remained for us to study the soil of several areas of land that were available. It is perhaps pertinent to state that an intermittent filtration effluent is more than a strained or filtered result. That while of course percolation goes on in such a process, the result depends largely upon the life and action of scavanger bacteria. The material employed as a filter has no value peculiar

to itself except as its physical condition is a factor. Coke, stone, cinders, sand, gravel, in fact any material which is not dissolved by sewage and has a uniform physical condition, will act satisfactorily, when so arranged that the sewage does not pass through it too quickly, and if supplied with a proper quantity of oxygen. Thus the material in a filtering or contact bed is only to provide a place where the bacteria can live and develop and come in contact with the organic matter of sewage. The amount of sewage that a contact or filter bed can care for in a given period of time, and the character of the effluent resulting from it, bear a direct relation to the coarseness and uniformity of the material employed; the more uniform the material the greater will be the air space, and the more satisfactory the effluent; in addition to this, the capacity of the bed will be greater. If the material in a contact bed is very coarse and would allow the sewage to pass through too quickly, the bed can be arranged with gates to regulate the flow. A filter that is not uniform will be no more efficient than the finest material in it. In beds constructed from material not uniform in size, the finer particles will often retard the capacity of the bed, and may even clog it.

Thus to determine the usefulness and application of any substance for filtration purposes, it is necessary to make a mechanical study of its physical character. This is done by the means of sieves of different specific fineness.

After the mechanical study of the soil has been made, a chemical analysis may be of value, as clay in some of its modifications, alkaline carbonates and salts of iron, if in excess, are to be condemned. They will diminish the capacity of the bed from 10 per cent. to 25 per cent. Of course natural areas if extensive will vary; one portion will be ideal, while another is only ordinary, and so the capacity of the different beds will vary in proportion to the mechanical and chemical analysis.

We were finally obliged to choose between an ordinary quality of sand on which the sewage could run by gravity, and an ideal quality of sand on which it would be necessary to pump the sewage. Here again the smaller cost of maintenance on proper soil decided the issue, and we determined to pump the sewage. This also gave us the added advantage of a more desirable location,

so far as surrounding habitation was concerned, and also a deeper ground water level, which would insure a better effluent with less under-draining. Ordinarily, sand filter beds have underdrains very close together, while at Saratoga we have only two lines in each bed, because of the deep ground water level.

Our system as approved by the State consists of many laterals, carrying only family sewage, emptying into a trunk sewer which conducts the sewage one and a half miles by gravity to the pumping station. Here it is received in a pump well of 16,000 gallons capacity, with three six-inch centrifugal pumps (two pumps being capable of handling the sewage at all times, the third pump being for an emergency). These pumps lift the sewage nineteen feet and force it 9,000 feet through a force main to the septic tanks which are located immediately adjoining the beds, and have a capacity of 1,000,000 gallons. From here it flows to the aerator, and from thence on to the beds, which are under-drained, and collect the effluent and return it to a common point where it is discharged into our village brook.

The septic tanks are built of concrete with a ventilated roof, located, as stated, at the disposal plant, adjoining the filter beds, and are arranged in four main compartments; in addition there are two other compartments which are designated as the receiving and discharging chambers; all of the tanks are arranged with gates, so that one or all can be used as we elect. The force main discharges into the receiving chamber which runs the entire length of the four retaining tanks, *i. e.*, across the north end; and in the walls separating the receiving chamber from the septic tanks is a line of two-inch holes, extending the entire length of the wall, midway between the top and bottom of the sewage level. It is through these openings that the sewage finds its way from the receiving into the septic tanks. The collecting or discharging chamber runs the entire length of the septic tanks on the south end, and collects the sewage as it passes out of the septic tanks through a line of two-inch holes situated exactly as those in the well of the opposite end where the sewage is received. From this chamber the sewage is conducted to the aerator, 100 feet distant. The aerator is made of sheet iron, twelve feet in diameter, in shape not unlike an opened umbrella, with a roughened surface to break

up the liquid as it flows over the aerator; in this way the absorption of oxygen is most satisfactory, and the necessary oxygen is supplied to the septic effluent before it goes on to the bed, replacing that which has been used up by bacterial action in the tanks, and which is essential for further bacterial action in the filters. From the aerator it flows to the dosing tank, which has a capacity of 50,000 gallons. When this quantity has collected, a float sets a syphon in action and the entire quantity is discharged on any bed elected and is called a "dose." There are a series of pipes between the beds, in the embankment, which are controlled by gates, and the caretaker can cause the sewage to flow on any particular beds he selects. At the dosing tank is a revolving automatic apparatus which will discharge the sewage on any four beds determined upon in rotation, in individual quantities of 50,000 gallons. The caretaker usually changes the gates of the beds on which sewage is discharged every twelve hours. Thus he uses a series of four beds for twelve hours, as described, and then allows them to rest for one, two or more days, according to the way they are acting.

Our intermittent filtration plant consists of twenty-one beds, identical in construction, two designated as sludge beds and nineteen as filtering beds, each bed having an area of about an acre. About six feet below the surface of the beds are ordinary tile drains, so arranged that they collect the effluent and conduct it to a common center. The beds are bounded by embankments, the height of which depends on the amount of soil necessarily removed to uncover the sand. In these embankments, pipes, manholes and gates are located, by which we control the distribution of the sewage. The surface of the beds is level in summer, unless crops are grown. The sewage flows on the beds in definite quantities, and at fixed intervals, to insure an even distribution of the sewage over the surface of the bed, a runway is placed across the bed, which distributes the sewage evenly over the entire surface of the bed. The daily quantity of sewage for each bed is governed by experience and variations in the area of the bed, the character of the soil, the condition of its surface and the season of the year, and varies from 50,000 to 250,000 gallons in twenty-four hours.

The same process of oxidation and nitrifaction of organic substances by the scavenger bacteria goes on in the surface of sand filtration beds, as would ordinarily occur if the same material were dumped on farm land when exposed to the atmcsphere. In such a plant as we have installed at Saratoga, we do not attempt to change nature's methods in any particular; on the contrary, we endeavored to so design our plant that nature can work under the most favorable conditions, and change a very large amount of organic matter more quickly and surely than under ordinary conditions. With this idea in mind, we so arranged the intake and discharge into and from the septic tanks that there is no direct current in the tanks; thus the top and bottom of the sewage in the tanks, in which the bacteria are most active, are not disturbed. We also protect our tanks with a cover on account of our severe winter weather, as the temperature also affects bacterial activity.

The change which occurs in organic sewage is essentially putrefaction; chemically, oxidation and nitrifaction. The changes are brought about by scavenger bacteria, the aerobic bacteria requiring the presence of free oxygen to carry on their activities and life; while the anerobic bacteria only thrive in an atmosphere or substance free from oxygen. Nature's process of sewage disposal is the same, whether carried on in the filter beds, or in the septic tanks, if it is under the same conditions, though there is a difference in her activity, depending entirely upon the local conditions and the character of the sewage. When normal sewage is treated under proper conditions, bacterial activity is more rapid and more satisfactory in the tanks than in the beds. Thus the preliminary treatment of sewage in tanks followed by aeration is a very important part of the disposal of the sludge, as this treatment disposes of from 50 per cent. to 60 per cent. of the solids, and so modifies the cost of maintenance very materially, as the surface of the beds requires but little attention. When the septic tank is employed as a preliminary treatment for sewage in connection with sand filters, there must be some method of aerating the sewage subject to bacterial action in the tanks, to replace the oxygen that has been used up by aerobic bacteria, before it flows onto the beds, if an ideal effluent is to be obtained.

What has been said represents in a disconnected way what has been done and what we hoped would occur when we commenced operating our plant in July, 1903. A resumé of the actual results and the cost of maintenance follows:

The plant has been in continuous operation for three and one-half years, and there has been an average of one and one-half million gallons of sewage discharged into the tanks daily; these would contain, according to the estimate of our engineer, during the three and one-half years mentioned, approximately 2,500,000 pounds of dry sludge, and by the same estimate, there are about 650,000 pounds in the tanks. Thus over 2,000,000 pounds of the solid constituents of the sewage has passed out in the sewage onto the sand filter beds, in a condition so modified that there is scarcely a deposit on the surface of the beds.

I will not confuse you by giving a lot of figures, but do wish to settle this point, so will simply review the work of tank No. 1 since its installation, for the purpose of showing the relative amount of sludge from year to year; tank No. 1 is the first in the series of four; there is practically no difference in them, or the amount of solids emptied into them or their bacterial results. The reading on our book, which is taken daily, shows, that on

March 5, 1904, there were 2½ feet scum at inlet and 1 inch at outlet, 2½ feet deposit at inlet and 9 inches deposit at outlet.
March 4, 1905, 3 feet scum at inlet, 2 inches scum at outlet and 1½ feet deposit at inlet, 2 inches at outlet.
March 2, 1906, 1 foot scum at inlet, 1 inch at outlet and 1 foot deposit at inlet, 1 inch deposit at outlet.
March 5, 1907, 1½ feet scum at inlet, 1 inch scum at outlet and 1½ feet deposit at inlet, 18 inches deposit at outlet.

These figures are the result of careful weekly measurements, and show just one-half as much sludge in the tanks, estimating both scum and deposits, as there was three years ago, six months after the sewage was turned into the tanks. Thus the bacteria have not only taken care of the solids in the daily sewage, but have disposed of half of the accumulation of the first six months.

Thus far we have been absolutely free from all local nuisances. There is a residence on the west, 100 feet from the beds, another

on the north 600 feet away. Visitors are frequent, and never detect any nuisance, and marvel at its absence. The average of solid matter in the tanks remains about the same, though gradually diminishing, being about 40 per cent. less by measurement now than in the winter of 1904, when the plant had been in operation only six months. The solids in the septic tank are divided, the heavier settling to the bottom in which the anerobic bacteria thrive; while the lighter product comes to the surface in the tank and forms the scum in which anerobic bacteria act.

I need hardly mention that the activity of all bacteria depends upon the temperature of the medium in which they exist. This is forcibly illustrated by our winter season,— as the temperature of the sewage becomes lower, the sludge in the tank increases. In the spring and summer, as the temperature becomes higher, we have an increased bacterial activity, and the accumulated sludge of the winter commences to disappear. The activity of the bacteria would also be modified by antiseptics, which may be present in sewage from municipalities particularly if there are manufacturing interests present using chemicals which are discharged into the sewage.

Thus while we provided two beds, when constructing our disposal system, where the sludge from the tanks could be received as the tanks become full, we have never used them; and to make a natural deduction, we never will need them unless in an emergency.

Our effluent has always been up to the State standard, chemically and bacteriologically, and is so at present, notwithstanding the expert opinion that a poor quality of effluent always resulted from sand filters, where the sewage is previously subjected to bacterial action.

We estimate that our sewage is subjected to bacterial action during a period of from four to ten hours, being less during the summer of course, when the quantity of sewage is greater.

The metering of our water supply resulted not only in controlling the waste of water and thus brought the quantity of sewage to be disposed of within a reasonable amount, but it was a monetary saving to the village, as it eventually resulted in our having an abundant water supply. For five years, previous to the installing

of meters, the village was on the verge of a water famine during certain months of the year, and had been forced to consider increasing the water supply. They had in fact done so, in a small way which had proved to be inadequate, and it seemed imperative to spend many thousands of dollars to meet the requirements of our village in this particular. We now, however, have an abundant supply for years to come, as the consumption of water has reached a normal point. This experience is a practical demonstration of the value of water meters in preventing the waste of water. In addition, there has been a material saving in the cost of conducting our pumping station; formerly we employed nine people there and we now have five. There is also a marked saving in the amount of fuel used. Our water is supplied by the Holley system, with two pumps, one capable of delivering 5,000,000 gallons a day and the other 8,000,000. At present, the smaller pump, at the minimum capacity, more than supplies our wants.

The system of water carriers, with their numerous catch basins, was a necessity, not only because it was an impossibility to provide an area sufficient to care for this immense body of sewage; but also, the flow through the septic tanks would have carried the solids or sludges onto the filter beds; moreover, in winter the surface water would have reduced the temperature so low that all bacterial activity would have been inhibited; it would also have been impossible to keep the beds from freezing up.

The cost of maintenance of the Saratoga sewage disposal plant, since its inception, has been so small that it is worthy of your careful attention; particularly as this item in the past at other disposal plants has been large; the usual cost of maintaining an intermittent sand filtration plant is many times greater than the combination method installed at Saratoga, because in the straight sand filtration scheme the sewage does not receive preliminary treatment in the septic tanks and aerator, and a large proportion of the solids in the sewage accumulate on the surface of the beds and have to be removed. If you will recall the fact that the septic tanks at the Saratoga filter beds have taken care of the solids from 2,000,000 gallons of sewage daily for three and one-half years; and that if we had not introduced the septic tanks in our system we would have had an enormous quantity of sludge

to remove from the surface of the beds and composted, you will appreciate the value of our combination method.

I wish particularly to emphasize this feature, because every plant with which I am familiar has an annual expense for the maintenance of its beds from two to ten times greater than the Saratoga beds; and in some of these the effluent is not up to the requirements of New York State. Further, because the annual saving in conducting the beds at Saratoga is due entirely to the results achieved in the septic tanks and aerator; and we have an effluent that is potable. An analysis, made by our Mr. Slack, in February, 1907, showed that its chemical and bacteriological analysis compared with good drinking water.

The average amount of solids removed from the beds since the beginning of their use has been one yard per acre annually. The principal part of this quantity is removed in the spring of the year, when the furrows are cleaned out, preparatory to leveling the surface for summer. The cost of maintenance has been carefully kept by our caretaker, is accurate, and we know the cost of each bed per year since our beginning. I consider this of so much importance, if a municipality is contemplating establishing a disposal plant, that at the risk of wearying you I shall quote somewhat in detail.

The entire cost for the care of the beds during 1904 was $757; 1905, was $819.87; 1906, was $905.90. From the last amount, $160 is to be deducted, which was received for produce, which would reduce the net cost to $745 for the year. Thus the expense for the care of each bed for a year would be only $37, which includes the preparation of the beds for winter, their leveling and care in the spring, and their weeding during the summer.

This information will possibly be of some value to other towns or villages interested in this subject, as they might be able to reach the disposal area by gravity and so obtain a very low maintenance, and also might not care so much for the general æsthetic appearance of the place as we do at Saratoga. We have so many visitors to our village who come only for pleasure and are impressed by appearances that we feel that our plant is an advertisement of the first class.

The $745 includes all expenditure of every kind for the beds.

In addition to this amount, we spend from $800 to $1,000 on the walks, embankments and general care of the plant. The power at the pumping station, labor, oil, etc., cost about $1,300; making a total of a little less than $3,000 expended yearly for the entire disposal procedures, which take care of 1,500,000 gallons of sewage daily. The small cost of the pumping station is due to the use of electricity as a motive power; the pumps work automatically, starting and stopping by means of floats, eliminating entirely any waste of electricity.

The general management of the beds requires a great deal of judgment. While no special technical training is required, yet the caretaker must have a fund of common sense, and acquire the practical kinks peculiar to the several beds, as well as to the seasons. He must have a thorough familiarity with the way a bed or beds acts in the warm season, and to know their capability and not to tax it which is one of the ways of avoiding local nuisance and expense. In addition to the knowledge, in the winter, the weather and storms have to be watched, that the beds do not become useless by freezing; for it must be borne in mind that our temperature at Saratoga for days and days is below zero, and often as low as 30 to 40 degrees below, and that the only protection the beds have from freezing is the coating of ice, and the only means of thawing out a bed is by the heat in the sewage, about 32, and the nearer the sewage comes to 32 the more sewage is required on a bed at a dose to remove the frost. The temperature of our sewage in the coldest weather averages about 40, though at times the surface of the septic tanks has frozen over, showing the absolute necessity for the protecting roof which our tanks have. The beds must be watched continuously, to determine their condition; and the caretaker must know the quantity of sewage that such bed is receiving, and be conversant with the capacity of each bed. This is so because, as I have stated, the soil varies even in a small area, and the activity of the beds will fluctuate according to local conditions. The capacity of our beds is easily 200,000 gallons daily, which is far beyond our estimate, and we believe it is due to the bacterial activity.

Our caretaker is one we have educated, perhaps you might say he has grown up with the proposition, and has proved to be a

most valuable man. He is without technical training, having always been a farm hand, but invariably displays good judgment.

The above description shows many pertinent conclusions:

1. That the method or methods of sewage disposal are not thoroughly settled or understood.

2. That while the State continues to allow the pollution of its streams with sewages, pure drinking water is almost impossible to obtain in quantities.

3. That if the pollution continues to increase in the future years as in the past, the State streams must be redeemed as a necessity for the safety of the public.

4. That if a State is to purify its polluted streams, it must demand the more general establishing of sewage disposal plants.

5. That there are many local conditions arising constantly, which demand sewage disposal plants to be established at once; and that local conditions are varied and must be studied by some one familiar with the problem, if satisfactory results are to be the outcome.

6. That if these things are so, the State should have a department which can be of service to the municipalities in advising them and directing them in a general way of the features to be studied and determined before adopting any method of disposal.

7. If this advice or guidance had been available when the Saratoga plant was established, several thousands of dollars could have been saved, as well as two years of time and anxiety saved the Commissioners who served without compensation.

8. That the Saratoga plant is an ideal one and is a success from every standpoint, *i. e.*, character of the effluent, the absence of local nuisances, and the nominal cost of maintenance.

9. There will always be local conditions to be determined when a sewage disposal plant is to be installed, and at present each municipality must do this without assistance or guidance from the State. In my judgment, the advice of sanitary engineers in general is not as satisfactory as would be the guidance or advice of the Department of Health in these matters. The local sewage must be studied as to character, quantity, dilution, temperature, etc. The area for filtration demands that an equally careful study be made of it. The character of the soil, the location, the level of

ground water are most important factors. It would take pages to go into this detail and show the absolute necessity of every detail, if a successful result is to be the outcome. The size of the septic tank has to be considered, as it is necessary to estimate the period of time required for the sewage to pass in and out of the tank, so that it may have a proper bacterial action as it passes through the tank. The means or method of receiving and discharging the sewage from the septic tank is of much importance in determining the bacterial results. If the flow is too rapid, the sludge is carried out onto the beds, and not only causes a nuisance, but the flow clogs the surface of the beds and thus entails extra labor and expense. While if the flow of sewage is too slow, excessive bacterial action may occur, and when this is the case, a poor effluent is said to occur; this fact has not as yet been proven. To be sure, Mr. Johnson, an expert of Boston, makes the statement that the State of Massachusetts is against the use of septic tanks under conditions at present existing, for this reason; and I judge he does so from results at Gordon, Hopedale, Andover and Worcester. The first three of these have no aerator associated with the plant. The Worcester sewage is full of chemicals, while at Clinton the results were the same until an aerator was installed, when the result was more like that at Saratoga, though I have not compared the analysis of effluent.

10. This being so, our experimental station should conduct studies and know why the results are achieved, and apply the principles to other municipalities; or at least if the conditions in another locality are proven to be such, after study and observation, that the principles of the Saratoga plant will not serve them, they can be advised accordingly and set right.

D. C. MORIARTA, M.D.
Director Sewage Experimet Station.

BUREAU OF PATHOLOGY AND BACTERIOLOGY

REPORT OF RICHARD M. PEARCE,

Director, Bureau of Pathology and Bacteriology

ALBANY, N. Y., *January* 3, 1907.

Dr. EUGENE H. PORTER, *Commissioner, State Department of Health, City:*

DEAR SIR:— I beg to report on the work done by the Bureau of Pathology and Bacteriology during the year 1906:

DIPHTHERIA.			Sputum.	Widals.	Water.	
January	Positive	41	20	2	Good	26
	Negative	46	21	16	Bad	4
	Not examined	9	....	Sugg. 2	Not exam.	3
	Number received	96	41	20		33
February	Positive	18	25	2	Good	20
	Negative	47	11	7	Bad	1
	Not examined	7	....	Sugg. 1	Not exam.	8
	Number received	72	36	10		29
March	Positive	32	11	1	Good	16
	Negative	47	29	10	Bad	1
	Not examined	3	....	....	Not exam.	16
	Number received	82	40	11		33
April	Positive	39	6	2	Good	16
	Negative	27	35	2	Bad	0
	Not examined	10	....	....	Not exam.	4
	Number received	76	41	4		20
May	Positive	14	16	1	Good	10
	Negative	21	28	7	Bad	2
	Not examined	12	Not exam. 1	Sugg. 1	Not exam.	14
	Number received	47	45	9		26
June	Positive	16	17	0	Good	18
	Negative	12	21	7	Bad	7
	Not examined	11	....	....	Not exam.	3
	Number received	39	38	7		28
July	Positive	13	17	0	Good	15
	Negative	12	25	4	Bad	2
	Not examined	9	....	....	Not exam.	3
	Number received	34	42	4		20
August	Positive	17	22	2	Good	35
	Negative	110	6	12	Bad	6
	Not examined	17	....	Sugg. 2	Not exam.	10
	Number received	144	28	16		51
September	Positive	10	11	4	Good	56
	Negative	19	21	9	Bad	10
	Not examined	22	....	....	Not exam.	23
	Number received	51	32	13		89

Bureau of Pathology and Bacteriology—(*Continued*).

DIPHTHERIA.			Sputum.	Widals.	Water.
October	Positive	20	15	4	Good 56
	Negative	22	10	9	Bad 11
	Not examined	12	....	Sugg. 1	Not exam. 14
Number received		54	25	14	81
November	Positive	68	9	8	Good 23
	Negative	49	23	11	Bad 5
	Not examined	15	....	Sugg. 3	Not exam. 6
Number received		132	32	22	34
December	Positive	104	11	2	Good 8
	Negative	88	18	11	Bad 0
	Not examined	21	Not exam. 1	....	Not exam. 1
Number received		213	30	13	9

Respectfully submitted,

R. M. PEARCE,
Director

BACTERIOLOGICAL EXAMINATIONS OF WATER.

Date of Report.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Jan. 3	Water. Creek 50 ft. above outflow of effluent.	Dr. Hazen, H.O., Brockport, N. Y.	6,730 organisms per c. c.	11,140 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 3	Water. Effluent...	Dr. Hazen, H.O., Brockport, N. Y.	20,000 organisms per c. c.	19,000 organisms per c. c.	....	Colon bacillus was isolated in pure culture. Evidence of organic pollution.
Jan, 3	Water. Creek 200 ft. below outflow of effluent.	Dr. Hazen, H.O., Brockport, N. Y.	9,100 organisms per c. c.	10,150 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 6	Water...........	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Well).	8,640 organisms per c. c.	6,890 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. Under conditions of examination there is no evidence of organic pollution.
Jan. 8	Water...........	Dr. G. E. Ellis, H.O., Dunkirk, N. Y. (Well).	6,890 organisms per c. c.	4,860 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. Under condition of examination water appears to be very satisfactory.
Jan. 8	Water, No. 1.....	Dr. J. W. Bickford, H. O., Lockport, N. Y. (From the rock).	....	....	....	Lost in transit owing to broken bottle.
Jan. 8	Water, No. 2.....	Dr. J. W. Bickford, H. O., Lockport, N. Y. (Spring).	17,820 organisms per c. c.	20,100 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. Under conditions of this examination there is no evidence of organic pollution, although the bacterial content is rather high for spring water.
Jan. 8	Water...........	Dr. Banning, Mt. Vernon, N. Y.	....	....	....	Sample destroyed in transit.
Jan. 8	Water, No. 1......	Presumably H.O., Canastota, N. Y. (Orn Cliff well.)	12,650 organisms per c. c.	24,800 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

DATE OF REPORT.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Jan. 8	Water, No. 2......	Presumably H. O., Canastota, N. Y. (Mill st. well.)	20,400 organisms per c. c.	16,000 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 8	Milk, No. 3.......	Presumably H. O., Canastota, N. Y. (Jeff. new milk.)	126,000 organisms per c. c.			
Jan. 8	Water, No. 4......	Presumably H. O., Canastota, N. Y. (Jeff. new well.)	8,740 organisms per c. c.	6,870 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 8	Water, No. 5......	Presumably H. O., Canastota, N. Y. (City water—faucet)	1,260 organisms per c. c.	2,800 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 8	Water, No. 6......	Presumably H. O., Canastota, N. Y. (Well water.)	2,800 organisms per c. c.	1,280 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 15	Water...........	Dr. John L. Hazen, H. O., Brockport, N. Y. (Outflow pipe.)	16,800 organisms per c. c.	19,270 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 18	Milk, No. 1.......	Dr. C. E. Weidman, H. O., Marcellus, N. Y. (Pond.)	3,000 organisms per c. c.	2,890 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 18	Milk, No. 2.......	Dr. C. E. Weidman, H. O., Marcellus, N. Y. (Faucet.)	565 organisms per c. c...	680 organisms per c. c...	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 18	Milk, No. 1.......	Mr. E. F. King. (Jefferson new dairy.)	110,000 organisms per c. c.			
Jan. 18	Water, No. 2......	Mr. E. F. King. (Reservoir intake.)	340,000 organisms per c. c.	Very diffuse growth.....	Negative....	Attempts to isolate colon bacillus in pure culture were negative.
Jan. 18	Water, No. 3......	Mr. E F. King. (Stream just below milk station.)	70,000 organisms per c. c.	68,500 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative.

Jan. 18	Water, No. 4......	Mr. E. F. King. (Faucet, village water.)	1,050 organisms per c. c.	1,280 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. Absence of colon bacillus and presumptive and other tests indicate no very serious pollution, although bacterial count in specimens 2 and 3 are very high.
Jan. 20	Water, No. 1......	Dr. C. S. Williams, H. O., La Fayette, N. Y. (Well at the house.)	3,000 organisms per c. c.	7,500 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 20	Water, No. 2......	Dr. C. S. Williams, H. O., La Fayette, N. Y. (Well at the mill.)	2,600 organisms per c. c.	3,100 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 20	Water............	Dr. Geo. D. Bradford, H. O., Homer, N. Y. (Well.)	720 organisms per c. c...	1,020 organisms per c c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 27	Water, No. 1......	Dr. J. R. Selover, H. O., Trumansburg, N. Y. (Creek.)	1,010 organisms per c. c.	980 organisms per c. c...	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 27	Water, No. 2......	Dr. J. R. Selover, H. O., Trumansburg, N. Y. (Ice pond.)	840 organisms per c. c...	1,020 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 27	Water, No. 3......	Dr. J. R. Selover, H. O., Trumansburg, N. Y. (Hotel well.)	1,480 organisms per c. c.	1,230 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 27	Water............	Dr. W. Carleton, H. O., Waterloo, N. Y. (Well.)	2,150 organisms per c. c.	3,140 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Jan. 27	Water, No. 1......	Mr. E. F. King, Lockport, N. Y. [Brewery spring, upper (top).]	2,700 organisms per c. c.	17,500 organisms per c. c.	....	The colon bacillus was isolated in pure culture.
Jan. 27	Water, No. 2......	Mr. E. F. King, Lockport, N. Y. [Brewery spring, upper (bottom).]	12,000 organisms per c. c.	14,000 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative.
Jan. 27	Water, No. 3......	Mr. E. F. King, Lockport, N. Y. (Brewery spring, lower.)	1,000 organisms per c. c.	15,000 organisms per c. c.	Positive....	The colon bacillus was isolated in pure culture.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

Date of Report.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Jan. 27	Water, No. 4	Mr. E. F. King, Lockport, N. Y. (McCullom and Chestnut sts. well: no pumping.)	100 organisms per c. c.	3,500 organisms per c. c.	Positive	The colon bacillus was isolated in pure culture.
Jan. 27	Water, No. 5	Mr. E. F. King, Lockport, N. Y. (McCullom and Chestnut sts. well, bottom of well.)	21,000 organisms per c. c.	14,000 organisms per c. c.	....	Attempts to isolate colon bacillus in pure culture were negative. Under conditions of examination, specimens 1, 3 and 4 show evidence of serious pollution. Although specimens 2 and 5 show no definite evidence of pollution, bacterial count is rather high. The waters as a group are very unsatisfactory.
Feb. 7	Water	Dr. R. M. Andrews, H. O., Bergen, N. Y. (Spring.)	1,680 organisms per c. c.	2,046 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 7	Water, No. 1	Dr. A. O. Squire, H. O., Ossining, N. Y. (Well water, taken from well 65 ft. deep.)	6,400 organisms per c. c.	11,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 7	Water, No. 2	Dr. A. O. Squire, H. O., Ossining, N. Y. (Well water, taken from well 25 ft. deep.)	1,680 organisms per c. c.	2,020 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 7	Water	Dr. Geo. D. Bradford, H. O., Homer, N. Y. (Well.)	260 organisms per c. c.	380 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 7	Water	Dr. W. H. Jessup, H. O., Newark, N. Y. (Well.)	1,340 organisms per c. c.	1,670 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 13	Water, No. 1	Dr. H. V. Bruce, Supt. N. Y. State Training School, Hudson, N. Y.	305 organisms per c. c.	310 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.

Feb. 13	Water, No. 2	Dr. H. V. Bruce, Supt. N. Y. State Training School, Hudson, N. Y.	1,500 organisms per c. c.	2,050 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 13	Water	Dr. O. J. Hallenbeck, H. O., Canandaigua, N. Y. (Well.)	2,140 organisms per c. c.	3,180 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 14	Water, No. 1	Dr. M. M. Dolan, H. O., South Glens Falls, N. Y. (Faucet at end of main.)	1,480 organisms per c. c.	1,730 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 14	Water, No. 2	Dr. M. M. Dolan, H. O., South Glens Falls, N. Y. (Faucet on Harrison ave.)	6,480 organisms per c. c.	7,900 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 24	Water	Dr. Louis A. Gould, H. O., Interlaken, N. Y. (Well.)	4,720 organisms per c. c.	2,390 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 24	Water	Dr. Chas. W. Lansing, H. O., Otisco, N. Y. (Well.)	9,700 organisms per c. c.	10,600 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 24	Water	Dr. L. H. Smith, H. O., Palmyra, N. Y.	1,280 organisms per c. c.	8,210 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 24	Water, No. 1	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Faucet.)	1,890 organisms per c. c.	2,900 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 24	Water, No. 2	Dr. G. E. Ellis, H. O., Dunkirk, N.Y. (Well.)	10,660 organisms per c. c.	20,100 organisms per c. c.	Positive	The colon bacillus was isolated in pure culture. Specimen shows pollution.
Feb. 24	Water, No. 1	Dr. Thos. McGann, H. O., Wells, N. Y. (Hotel well.)	....	....	....	Appearance of this water is such as to indicate its unfitness for drinking purposes. Bacteriological examination unnecessary.
Feb. 24	Water, No. 2	Dr. Thos. McGann, H. O., Wells, N. Y. (Town well.)	4,680 organisms per c. c.	4,200 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 24	Water	Dr. H. S. Bontecou, H. O., Matteawan, N. Y. (Well.)	2,140 organisms per c. c.	3,600 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

DATE OF REPORT.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Feb. 24	Water, No. 1	Dr. G. S. Pearce, H. O., Pawling, N. Y. (Factory faucet.)	1,350 organisms per c. c.	2,780 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution
Feb. 24	Water, No. 2	Dr. G. S. Pearce, H. O., Pawling, N. Y.(Well, Denton's cellar.)	6,800 organisms per c. c.	7,200 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 24	Water, No. 3	Dr. G. S. Pearce, H. O., Pawling, N.Y. (Pond at Reynoldsville.)	6,870 organisms per c. c.	7,860 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Feb. 24	Water, No. 4	Dr. G. S. Pearce, H. O., Pawling, N. Y. (Spring.)	2,900 organisms per c. c.	9,200 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Mar. 2	Water, No. 1	Dr. Samuel W. Close, H. O., Gouverneur, N. Y. (East Side School well.)	300 organisms per c. c.	No growth	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Mar. 2	Water, No. 2	Dr. Samuel W. Close, H. O., Gouverneur, N. Y. (J. H. Abbott well.)	200 organisms per c. c.	No growth	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Mar. 2	Water, No. 3	Dr. Samuel W. Close, H. O., Gouverneur, N. Y. (Faucet—river water.)	250 organisms per c. c.	No growth	Positive	The colon bacillus was isolated in pure culture. This specimen shows pollution.
Mar. 12	Water	Dr. J. B. Biggs, H. O., Somerset, N. Y. (Well.)	4,380 organisms per c. c.	3,980 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Mar. 12	Water	Dr. O. G. Harrington, H. O., Constableville, N. Y. (Pipe from spring.)	6,870 organisms per c. c.	10,500 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.

Mar. 14	Water, No. 1......	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Well.)	5,890 organisms per c. c.	6,430 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Mar. 14	Water, No. 2......	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Well.)	3,160 organisms per c. c.	2,780 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative No evidence of organic pollution.
Mar. 14	Water, effluent from disposal plant at White Plains.	Mr. E. F. King, Inspecting Engineer.	....	....	....	Specimen lost in transit owing to breakage of bottle.
Mar. 14	Water............	Mr. E. F. King, Inspecting Engineer. (Bronx river.)	6,240 organisms per c. c.	7,180 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative.
Mar. 15	Water............	Dr. W. W. Jones, H. O., Dayton, N. Y. (Well.)	20,480 organisms per c.	19,600 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. There is no evidence of organic pollution, although the bacterial count is rather high.
Mar. 22	Water, No. 1......	Dr. J. C. Clark, H. O., Olean, N. Y. (Well.)	Diffuse growth.........	6,080 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Mar. 22	Water, No. 2......	Dr. J. C. Clark, H. O., Olean, N. Y. (Faucet.)	Diffuse growth.........	33,100 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Mar. 28	Water, No. 1......	Dr. L. B. Rulison, H. O., Watervliet, N. Y. (Faucet.)	960 organisms per c. c...	6,500 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Mar. 28	Water, No. 2......	Dr. L. B. Rulison, H. O., Watervliet, N. Y. (Brook.)	3,050 organisms per c. c.	56,000 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution, although the bacterial count is rather high.
Mar. 31	Water, No. 1......	Dr. J. W. Bickford, H. O., Lockport, N. Y. (Well, sample No. 1.)	26,475 organisms per c. c.	17,175 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
Mar 31	Water, No. 2......	Dr. J. W. Bickford, H. O., Lockport, N. Y. (Well, sample No. 2.)	19,650 organisms per c. c.	29,100 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 5	Water............	Dr. E. P. McWayne, H. O., Fayette, N. Y. (Well.)	1,000 organisms per c. c.	50,000 organisms per c. c.	Negative....	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

Date of Report.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. April 9	Water	Dr. David Mosher, H. O., Marlborough, N. Y. (Well.)	1,540 organisms per c. c.	825 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 9	Water, No. 1	Dr. O. W. Peck, H. O., Oneonta, N. Y. (Public supply.)	7,000 organisms per c. c.	22,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 9	Water, No. 2	Dr. O. W. Peck, H. O., Oneonta, N. Y. (Well.)	150 organisms per c. c.	500 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 9	Water	Dr. J. H. Jenkin, H. O., Shrub Oak, N. Y. (Mountain spring.)	2,200 organisms per c. c.	9,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 9	Water, 4 specimens taken 4 consecutive days.	Rome Custodial Asylum, Rome, N. Y. (Crude water before passing Filter "1.")	....	I, 3,900 (average of 2 gelatin counts). II, 22,000 (average of 2 gelatin counts). III, 11,500 (average of 2 gelatin counts). IV, 17,000 (average of 2 gelatin counts).		
April 9	Water, 4 specimens taken 4 consecutive days.	Rome Custodial Asylum, Rome, N. Y. (Filtered water before cleaning Filter "2.")	....	I, 22,000 (average of 2 gelatin counts). II, 13,300 (average of 2 gelatin counts). III, 2,200 (average of 2 gelatin counts). IV, 3,400 (average of 2 gelatin counts).		
April 9	Water, 4 specimens taken 4 consecutive days.	Rome Custodial Asylum, Rome, N. Y. (Filtered water after cleaning Filter "3.")	....	I, 3,600 (average of 2 gelatin counts). II, 3,800 (average of 2 gelatin counts). III, 1,050 (average of 2 gelatin counts). IV, 1,800 (average of 2 gelatin counts).		

April 11	Water, No. 1	Dr. Stuart W. Nelson, H. O., Old Forge, N. Y. (Well R. R. station—clear water.)	...	...	...	Bottle broken in transit.
April 11	Water, No. 2	Dr. Stuart W. Nelson, H. O., Old Forge, N. Y.	240 organisms per c. c.	2,500 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative.
April 16	Water, No. 1	Dr. W. R. Sitler, Suffern, N. Y. (Well.)	110 organisms per c. c.	13,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 16	Water, No. 2	Dr. W. R. Sitler, Suffern, N. Y. (Well.)	65 organisms per c. c.	52,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution, although the bacterial count is rather high.
April 16	Water, No. 3	Dr. W. R. Sitler, Suffern, N. Y.	25 organisms per c. c.	29,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 18	Water	Dr. L. B. Darling, H. O., Palmyra, N. Y.	3,000 organisms per c. c.	24,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 18	Water	Dr. W. W. Carleton, H. O., Waterloo, N. Y. (Well.)	100 organisms per c. c.	2,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 26	Water, No. 1	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Canadaway Creek.)	...	...	...	Sample was lost in transit owing to breakage of bottle.
April 26	Water, No. 2	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (City faucet.)	880 organisms per c. c.	940 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 26	Water, No. 3	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Gerran's pond.)	650 organisms per c. c.	870 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 26	Blood	...	...	...	...	Sample unsatisfactory. Impossible to make satisfactory examination.
April 27	Water	Dr. W. T. Jonés, H. O., Alpine, N. Y. (Well.)	430 organisms per c. c.	290 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
April 28	Water	Dr. C. A. Chase, H. O., Corning, N. Y.	1,050 organisms per c. c.	1,230 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

Date of Report.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. April 30	Water	Dr. Fred W. Delmage, H.O., Hermon, N.Y. (Well.)	705 organisms per c. c.	15,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution, although bacterial count is rather high.
May 7	Water, No. 1	Novitiate of St. Andrew-on-Hudson, Poughkeepsie, N. Y. (Reservoir, dated May 2.)	2,150 organisms per c. c.	3,800 organisms per c. c.	Positive	Bacterial count was comparatively low, but positive presumptive test renders this water suspicious.
May 7	Water, No. 2	Novitiate of St. Andrew-on-Hudson, Poughkeepsie, N. Y. (Reservoir, dated May 3.)	900 organisms per c. c.	2,200 organisms per c. c.	Negative	Bacterial count was comparatively low, but water is suspicious.
May 7	Water	Dr. N. H. Fuller, H. O., Friendship, N. Y. (Well.)	1,550 organisms per c. c.	50,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution, although bacterial count is rather high.
May 11	Water	Dr. W. H. Nichelson, H. O., Adams, N. Y. (Well.)	1,200 organisms per c. c.	640 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
May 14	Milk	Mr. Bucklin, dairyman, of Gouverneur, N. Y.	42,000 organisms per c. c.	....	....	Specimen is a very clean milk for milk gathered without special precautions. Determination of bacterial content of milk is not very satisfactory, and no definite conclusion should be drawn from it.
May 14	Water	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Cistern.)	A few colonies and large molds.	50,000 organisms per c. c.	Positive	The colon bacillus was isolated in pure culture. The water shows organic pollution.
May 17	Water	Dr. B. R. Bevier, H. O., Napanoch, N. Y. (Well.)	600 organisms per c. c.	Gelatin plates were entirely liquefied.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.

May 23	Water	Dr. W. K. Jessup, H. O., Newark, N. Y. (Well.)	400 organisms per c. c.	A diffuse growth	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
May 23	Water	Dr. C. G. Strobel, H. O., Dolgeville, N. Y. (Faucet.)	150 organisms per c. c.	1,300 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
May 29	Water	Dr. Geo. S. Means, H. O., Geneva, N. Y. (Well.)	600 organisms per c. c.	Gelatin plates were liquefied, with no odor.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
May 30	Water	Dr. J. C. Clark, H. O., Olean, N. Y. (Well.)	1,350 organisms per c. c.	2,700 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
May 31	Water	Dr. E. P. McWayne, H. O., Fayette, N. Y. (Well.)	10,000 organisms per c. c.	40,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution, although the bacterial count is rather high.
June 2	Water, No. 1	Dr. A. C. Santee, H. O., Scotchtown, N. Y. (Wallkill creek, outlet Monhagen brook.)	40,000 organisms per c. c.	18,000 organisms per c. c.	Positive	The colon bacillus was isolated in pure culture. Specimen shows organic pollution.
June 2	Water, No. 2	Dr. A. C. Santee, H. O., Scotchtown, N. Y. (Wallkill creek, at Midway park.)	30,000 organisms per c. c.	50,000 organisms per c. c.	Positive	The colon bacillus was isolated in pure culture. Specimen shows organic pollution.
June 2	Water, No. 3	Dr. A. C. Santee, H. O., Scotchtown, N. Y. (Wallkill creek.)	22,000 organisms per c. c.	4,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. While specimen does not show organic pollution, it shows high bacterial counts.
June 2	Water, No. 4	Dr. A. C. Santee, H. O., Scotchtown, N. Y. (Wallkill creek, south of Hopkins bridge.)	30,000 organisms per c. c.	50,000 organisms per c. c.	Negative, but suspicious.	Specimen shows suspicion of organic pollution.
June 2	Water, No. 5	Dr. A. C. Santee, H. O., Scotchtown, N. Y. (Wallkill creek, rear of creamery.)	18,000 organisms per c. c.	28,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. Specimen does not show organic pollution, but does show high bacterial counts.
June 2	Water No. 6	Dr. A. C. Santee, H. O., Scotchtown, N. Y. (Wallkill creek at Marsh's mill.)	40,000 organisms per c. c.	20,000 organisms per c. c. and showed liquefaction with no odor.		Specimen does not show organic pollution but shows high bacterial counts.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

DATE OF REPORT.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. June 2	Water	Dr. W. N. MacArtney, H. O., Fort Covington, N. Y. (G. Paddock's well.)	10,000 organisms per c. c.	30,000 organisms per c. c. and were liquefied with odor.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution although count on gelatin plates is rather high.
June 2	Water, No. 1	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Well, 9:44 a. m)	600 organisms per c. c.	400 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
June 2	Water, No. 2	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Well, 9:53 a. m.)	8,000 organisms per c. c.	10,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
June 7	Water, No. 1	Dr. Henry C. Wilber, H. O., Pine Plains, N. Y. (Pipe running from spring.)	10,000 organisms per c. c.	50,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution, although the bacterial count is high.
June 7	Water, No. 2	Dr. Henry C. Wilber, H. O., Pine Plains, N. Y. (Well.)	50,000 organisms per c. c.	10,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution although the bacterial count is high.
June 8	Water	Dr. Chas. Frazier, H. O., Cobleskill, N. Y. (Well.)	20,000 organisms per c. c.	50,000 organisms per c. c. were liquefied and had putrefactive odor.	Positive	The colon bacillus was isolated in pure culture. There is evidence of organic pollution.
June 11	Water	Dr. Geo. S. Pearce, H. O., Pawling, N. Y. (Well.)	Molds	22,000 organisms per c. c.	Negative	Attempts to isolate colon bacillus in pure culture were negative. No evidence of organic pollution.
June 14	Water	Dr. E. P. McWayne, H. O., Fayette, N. Y. (Well.)	Molds	22,000 organisms per c. c.	Positive	The bacillus coli was isolated in pure culture. There is evidence of organic pollution.
June 14	Water	Dr. A. W. Wheeler, H. O., Norfolk, N. Y. (Well.)	18,000 organisms per c. c.	28,000 organisms per c. c.	Positive	The colon bacillus was isolated in pure culture. There is evidence of organic pollution.
June 14	Water	Dr. W. W. Davis, H. O., Chester, N. Y. (Well.)	40,000 organisms per c. c.	32,000 organisms per c. c.	Positive	The bacillus coli was isolated in pure culture. There is evidence of organic pollution.
June 16	Water	Dr. H. S. Campbell, H. O., La Salle, N. Y. (Well.)	3,500 organisms per c. c.	30,000 organisms per c. c.	Negative	There is no evidence of organic pollution.

June 19	Water	Dr. E. B. Merwin, H. O., Manlius, N. Y. (Well, with no pump.)	9,000 organisms per c. c.	35,000 organisms per c. c.	Positive	There is evidence of organic pollution.
June 20	Water	Dr. F. W. Clark, H. O., Williamson, N. Y.	20,000 organisms per c. c.	30,000 organisms per c. c.	Negative	No evidence of organic pollution although from the naked eye appearance of water would suggest that a chemical examination be made.
June 21	Water	Dr. E. M. Clark, H. O., Mamaroneck, N. Y. (Well.)	Molds	13,000 organisms per c. c.	Negative	Attempts to isolate bacillus coli in pure culture were negative. No evidence of organic pollution.
June 25	Water	Schenectady Fresh Air Farm, Schenectady, N. Y. (Bucket from well.)	Mold	40,000 organisms per c. c.	Negative	No evidence of organic pollution.
June 29	Water	Dr. W. F. Smeltzer, H. O., Bergen, N. Y. (Well.)	16,000 organisms per c. c.	14,000 organisms per c. c.	Negative	No evidence of organic pollution.
June 30	Water	Dr. Erwin W. Witt, H. O., Brownville, N. Y. (Spring.)	Molds	12,000 organisms per c. c.	Negative	The physical appearances of this water are such as to indicate that it is unfit for drinking purposes.
June 30	Sediment, 10 to 15 c. c. of greenish black thick sediment.	Dr. Erwin W. Witt, H. O., Brownville, N. Y. (Deposit that adheres to stones in bottom of Clarke spring.)	20,000 organisms per c. c. Foul odor.	20,000 organisms per c. c.	Negative	Foul odor may be due to cheese factory about ¼ mile up creek.
June 30	Water	Dr. Hibbard, H. O., Olean, N. Y. (Driven well.)	25,000 organisms per c. c.	50,000 organisms per c. c.	Negative	No evidence of organic pollution although the bacterial count is rather high.
July 3	Water, No. 1	Dr. E. M. Shaffner, Great Valley, N. Y. (From well near an old cemetery.)	4,800 organisms per c. c.	35,000 organisms per c. c.	Negative	*The five fermentation tubes showed no gas formation.
July 3	Water, No. 2½	Dr. E. M. Shaffner, Great Valley, N. Y. (Well near old cemetery.)	5,000 organisms per c. c.	8,000 organisms per c. c.	Negative	*The five fermentation tubes showed no gas formation.
July 3	Water, No. 3	Dr. E. M. Shaffner, Great Valley, N. Y. (Well near old cemetery.)	4,100 organisms per c. c.	37,000 organisms per c. c.	Negative	*In making fermentation test, gas developed in all tubes, but was not of the type formed by colon bacillus. Plants on litmus-lactose-agar for purpose of isolating colon bacillus show no acid forming colonies characteristic of this or allied organisms.

* It is a very important fact that although the specimens were shipped on June 29th, it is stated that they were taken on "June 14th, but kept hermetically sealed." Under such circumstances the examination is of no value, as it does not represent the condition of the water bacteriologically at the time it was collected.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

Date of Report.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. July 11	Water	Mr. S. W. Smith, Chatham, N. Y. (Merwin pond.)	6,000 organisms per c. c.	18,000 organisms per c. c.	Negative	There is no evidence of organic pollution.
July 12	Water	Dr. F. S. Cole, H. O., Schroon Lake, N. Y. (Spring.)	5,000 organisms per c. c.	50,000 organisms per c. c.	Negative	There is no evidence of organic pollution.
July 13	Water, No. 1	Chas. Bernstein, Supt. of State Custodial Asylum, Rome, N.Y. (Faucet.)	4,000 organisms per c. c.	22,000 organisms per c. c.	Negative	No evidence of organic pollution.
July 13	Water, No. 2	Chas. Bernstein, Supt. of State Custodial Asylum, Rome, N.Y. (3½-inch outlet pipe to filter.)	3,000 organisms per c. c.	17,000 organisms per c. c.	Negative	No evidence of organic pollution.
July 13	Water, No. 3	Chas. Bernstein, Supt. of State Custodial Asylum, Rome, N.Y. (Discharge from filter.)	50,000 organisms per c. c.	50,000 organisms per c. c.	Positive	There is evidence of organic pollution.
July 17	Water	Dr. W. H. Jessup, H. O., Newark, N. Y. (Well.)	4,000 organisms per c. c.	1,000 organisms per c. c.	Negative	No evidence of organic pollution.
July 17	Water, No. 1	Dr. W. U. Taylor, H. O., Mooers, N. Y. (Well.)	8,000 organisms per c. c.	10,000 organisms per c. c.	Negative	No evidence of organic pollution.
July 17	Water, No. 2	Dr. W. U. Taylor, H. O., Mooers, N. Y. (Cistern pump.)	1,000 organisms per c. c.	No organisms per c. c.	Negative	No evidence of organic pollution.
July 28	Water, No. 1	Dr. P. C. Curtis, Round Lake, N. Y. (Well.)	50,000 organisms per c. c.	Gelatin plates were liquefied with odor.	Positive	Water shows evidence of organic pollution.
July 28	Water, No. 2	Dr. P. C. Curtis, Round Lake, N. Y. (Faucet.)	20,000 organisms per c. c.	Gelatin plates were liquefied with odor.	Negative	No evidence of organic pollution.
July 31	Water, No. 1	Dr. R. C. Waterbury, H. O., Averill Park, (Well.)	15,000 organisms per c. c.	Gelatin plates were liquefied with odor.	Negative	No evidence of organic pollution.

July 31	Water, No. 2......	Dr. R. C. Waterbury, H. O., Averill Park, N. Y. (Well.)	2,000 organisms per c. c.	Gelatine plates liquefied.	Negative....	No evidence of organic pollution.
July 31	Water, No. 3......	Dr. R. C. Waterbury, H. O., Averill Park, N. Y. (Spring.)	2,500 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Aug. 2	Water............	Dr. B. E. Decker, Bradford, N. Y.....	10,000 organisms per c. c.	Gelatin plates liquefied..	Positive.....	There is evidence of organic pollution.
Aug. 4	Water............	Dr. J. E. Wenzel, H. O. Callicoon, N. Y.....	3,000 organisms per c. c..	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Aug. 4	Water............	Dr. G. S. Hubbell, H. O., Hobart, N. Y.	500 organisms per c. c...	Gelatin plates liquefied with slight odor.	Negative....	No evidence of organic pollution.
Aug. 4	Water, No. 1......	Dr. J. E. Wenzel, H. O., Callicoon, N. Y. (Anderson springs.)	2,000 organisms per c. c	Gelatin plates liquefied with slight odor.	Negative....	No evidence of organic pollution.
Aug. 4	Water, No. 2......	Dr. J. E. Wenzel, H. O., Callicoon, N. Y. (Mitchell springs.)	300 organisms per c. c....	Gelatin plates partially liquefied.	Negative....	No evidence of organic pollution.
Aug. 4	Water, No. 3......	Dr. J. E. Wenzel, H. O., Callicoon, N. Y.	1,000 organisms per c. c.	Gelatin plates were liquefied.	Negative....	No evidence of organic pollution.
Aug. 4	Water, No. 4......	Dr. J. E. Wenzel, H. O., Callicoon, N. Y.	3,000 organisms per c. c.	Gelatin plates were liquefied.	Negative....	No evidence of organic pollution.
Aug. 4	Water, No. 1......	Dr. W. H. Snyder, H. O., Newburgh, N. Y. (Spring.)	2,500 organisms per c. c.	Gelatin plates liquefied with odor.	Negative....	No evidence of organic pollution.
Aug. 4	Water, No. 2......	Dr. W. H. Snyder, H. O., Newburgh, N. Y. (Well.)	30,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Aug. 4	Water, No. 3......	Dr. W. H. Snyder, H. O., Newburgh, N. Y. (Well.)	3,000 organisms per c. c.	Gelatin plates liquefied with slight odor.	Positive.....	There is evidence of organic pollution.
Aug. 4	Water, No. 4......	Dr. W. H. Snyder, H. O., Newburgh, N. Y. (Well.)	50,000 organisms per c. c.	Gelatin plates liquefied..	Positive.....	There is evidence of organic pollution.
Aug. 4	Water, No. 5......	Dr. W. H. Snyder, H. O., Newburgh, N. Y.	4,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	There is no evidence of organic pollution.
Aug. 4	Water, No. 1......	Health Officer, Plattsburg, N. Y.	20,000 organisms per c. c.	Gelatin plates were liquefied with slight odor.	Negative....	No evidence of organic pollution.
Aug. 4	Water, No. 2......	Health Officer, Plattsburg, N. Y.	50,000 organisms per c. c.	Gelatin plates were liquefied with odor.	Positive.....	There is evidence of organic pollution.
Aug. 4	Water, No. 3......	Health Officer, Plattsburg, N. Y.	500 organisms per c. c...	Gelatin plates were liquefied with slight odor.	Negative....	No evidence of organic pollution.
Aug. 4	Water............	Dr. L. M. Andrews, H. O., Warsaw, N. Y.	1,500 organisms per c. c.	Gelatin plates liquefied with odor.	Negative....	No evidence of organic pollution.
Aug. 7	Water............	F. A. Stevens, Horseheads, N. Y.	30,000 organisms per c. c.	Gelatin plates liquefied with odor.	Negative....	No evidence of organic pollution.
Aug. 7	Water, No. 1......	Dr. J. W. Bickford, H. O., Lockport, N. Y. (Water from top of well.)	20,000 organisms per c. c.	Gelatin plates liquefied..	Positive.....	There is evidence of organic pollution

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

DATE OF REPORT.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Aug. 7	Water, No. 2	Dr. J. W. Bickford, H. O., Lockport, N. Y. (Water from bottom of well.)	35,000 organisms per c. c.	Gelatin plates liquefied with odor.	Negative	No evidence of organic pollution.
Aug. 7	Water	Dr. E. A. Simond, H. O., Carthage, N. Y. (Well at Columbian Hotel.)	20,000 organisms per c. c.	Gelatin plates liquefied with odor.	Negative	No evidence of organic pollution.
Aug. 16	Water	Dr. J. A. Hazen, H. O., Brockport, N. Y. (Well.)	500 organisms per c. c.	1,000 organisms per c. c.: were partially liquefied	Negative	No evidence of organic pollution.
Aug. 18	Water	Dr. A. C. Knapp, H. O., Dryden, N. Y. (Well.)	20,000 organisms per c. c.	10,000 organisms per c. c.	Negative	No evidence of organic pollution.
Aug. 20	Water	Dr. E. H. Hackett, H. O., Massena, N. Y. (Faucet.)	500 organisms per c. c.	Gelatin plates liquefied with slight odor.	Negative	No evidence of organic pollution.
Aug. 20	Water	Dr. F. L. Winsor, H. O., Laurens, N. Y. (Faucet.)	500 organisms per c. c.	Gelatin plates were liquefied with slight odor.	Negative	No evidence of organic pollution.
Aug. 24	Water	Dr. W. H. Snyder, H. O., Newburgh, N. Y. (Waring well.)	400 organisms per c. c.	Gelatin plates liquefied, probably due to extreme heat.	Negative	No evidence of organic pollution.
Aug. 24	Water	Dr. C. G. Strobel, H. O., Dolgeville, N. Y. (Faucet.)	30 organisms per c. c.	Gelatin plates were liquefied, probably due to extreme heat.	Negative	No evidence of organic pollution.
Aug. 24	Water	Dr. George Haner, H. O., Tannersville, N. Y. (Faucet.)	50 organisms per c. c.	Gelatin plates were liquefied, probably due to extreme heat.	Negative	No evidence of organic pollution.
Aug. 24	Water	Dr. E. W. Bryan, H. O., Corning, N. Y. (Pump well.)	450 organisms per c. c.	Gelatin plates liquefied, probably due to extreme heat.	Negative	No evidence of organic pollution.
Aug. 24	Water	Dr. John F. Cotter, H. O., Campbell Hall, N. Y. (Spring.)	800 organisms per c. c.	Gelatin plates liquefied, probably due to extreme heat.	Negative	No evidence of organic pollution.
Aug. 27	Water	Dr. G. W. Dodge, H. O., Moravia, N. Y. (Faucet.)	30,000 organisms per c. c.	Gelatin plates liquefied, probably due to extreme warm weather.	Negative	No evidence of organic pollution.

Aug. 27	Water	Dr. T. J. Whitney, H. O., Frewsburg, N. Y. (Driven well.)	3,000 organisms per c. c.	Gelatin plates liquefied, probably due to extreme warm weather.	Negative	No evidence of organic pollution.
Aug. 29	Water	Dr. George Hawley, H. O., Baldwinsville, N. Y. (Faucet.)	40,000 organisms per c. c.	Gelatin plates liquefied, probably due to extreme warm weather.	Negative	No evidence of organic pollution.
Aug. 29	Water	Dr. W. F. Smeltzer, H. O., Bergen, N. Y. (Well.)	1,000 organisms per c. c.	Gelatin plates solid, probably due to extreme warm weather.	Negative	No evidence of organic pollution.
Aug. 30	Water	Dr. M. McDaniels, H. O., Enfield Centre, N. Y. (Well.)	10,000 organisms per c. c.	Gelatin plates liquefied, probably due to extreme warm weather.	Negative	No evidence of organic pollution.
Aug. 30	Water, No. 1	Dr. E. D. Williams, H. O., East Otto, N. Y. (Well.)	3,000 organisms per c. c.	Gelatin plates liquefied, probably due to extreme warm weather.	Negative	No evidence of organic pollution.
Aug. 30	Water, No. 2	Dr. E. D. Williams, H. O., East Otto, N. Y. (Well.)	1,500 organisms per c. c.	Gelatin plates liquefied, probably due to warm weather.	Negative	No evidence of organic pollution.
Aug. 30	Water, No. 1	Dr. C. H. Glidden, H. O., Little Falls, N. Y. (Faucet.).	40,000 organisms per c. c.	Gelatin plates liquefied, probably due to extreme warm weather.	Negative	No evidence of organic pollution.
Aug. 30	Water, No. 2	Dr. C. H. Glidden, H. O., Little Falls, N. Y. (Spring.)	40,000 organisms per c. c.	Gelatin plates liquefied, probably due to extreme warm weather; slight odor.	Negative	No evidence of organic pollution.
Aug. 31	Water	Dr. C. W. Winspear, H. O., Newark, N. Y (Iron pump well.)	2,000 organisms per c. c.	Gelatin plates liquefied, probably due to warm weather.	Negative	No evidence of organic pollution.
Aug. 31	Water	Dr. I. L. Goff, H. O., Howard, N. Y. (Well.)	1,000 organisms per c. c.	Gelatin plates liquefied, probably due to warm weather.	Negative	No evidence of organic pollution.
Sept. 1	Water	Dr. Wm. H. Jessup, H. O., Newark, N. Y. (Well.)	250 organisms per c. c.	Gelatin plates liquefied, probably due to warm weather.	Negative	No evidence of organic pollution.
Sept. 1	Water	Dr. F. J. Redmond, H. O., Fillmore, N. Y. (Well.)	500 organisms per c. c.	Gelatin plates semi-solid	Negative	No evidence of organic pollution.
Sept. 1	Water	Dr Fred S. Deyoe, H. O., Hunter, N. Y. (Well.)	No growth	Gelatin plates were solid.	Negative	No evidence of organic pollution.
Sept. 3	Water	Dr. John I. Cotter, H. O., Campbell Hall, N. Y. (Well.)	Almost no growth	Gelatin plates were semi-solid; 1,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 3	Water, No. 1	Dr. W. W. Carleton, H. O., Waterloo, N. Y. (Bank well.)	8,000 organisms per c. c.	Gelatin plates liquefied, probably due to warm weather.	Negative	No evidence of organic pollution.
Sept. 3	Water, No. 2	Dr. W. W. Carleton, H. O., Waterloo, N. Y. (Schott well.)	10,000 organisms per c. c.	Gelatin plates liquefied, probably due to warm weather.	Negative	No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER —(*Continued*).

Date of Report.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Sept. 3	Water	Dr. C. J. Pollard, H. O., Oriskany Falls, N. Y. (Overflow from Spring reservoir.)	No growth	800 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 6	Water	Dr. Louis A. Harris, H. O., Newburgh, N. Y (Well, town.)	1,000 organisms per c. c.	5,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 7	Water, No. 1	Dr. B. S. Brown, H. O., Hamburgh, N. Y. (Well, village.)	1,500 organisms per c. c.	25,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 7	Water, No. 2	Dr. B. S. Brown, H. O., Hamburgh, N. Y. (Odell well.)	500 organisms per c. c.	5,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 7	Water	Dr. J. H. Moon, H. O., Cooperstown, N. Y. (Artesian well.)	5,000 organisms per c. c.	Gelatin plates were slightly liquefied.	Negative	No evidence of organic pollution.
Sept. 9	Water	Dr. J. M. Purcell, H. O. Mechanicville, N. Y.	800 organisms per c. c.	8,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 9	Water, No. 1	Dr. B. S. Brown, H. O., Hamburgh, N. Y. (Odell well.)	2,000 organisms per c. c.	20,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 9	Water, No. 2	Dr. B. S. Brown, H. O., Hamburgh, N. Y. (Village well.)	500 organisms per c. c.	Gelatin plates were slightly liquefied.	Negative	No evidence of organic pollution.
Sept. 9	Water	Dr. Charles R. Skinner, H. O., Copake, N. Y. (Drive well.)	500 organisms per c. c.	Gelatin plates slightly liquefied.	Negative	No evidence of organic pollution.
Sept. 10	Water, No. 1	Dr. W. H. Snyder, H. O., Newburgh, N. Y. (Well.)	10,000 organisms per c. c.	Gelatin plates liquefied.	Positive	There is evidence of organic pollution.
Sept. 10	Water, No. 2	Dr. W. H. Snyder, H. O., Newburgh, N. Y. (Spring.)	5,000 organisms per c. c.	Gelatin plates liquefied	Negative	No evidence of organic pollution.
Sept. 10	Water	Dr. F. D. Vanderhoof, H. O., Phelps, N. Y. (Well.)	5,000 organisms per c. c.	Gelatin plates liquefied	Negative	No evidence of organic pollution.
Sept. 10	Water, No. 1	Dr. J. H. Dingman, H.O. Madalin, N. Y. (Well.)	1,500 organisms per c. c.	Gelatin plates liquefied	Negative	No evidence of organic pollution.

Sept. 10	Water No. 2......	Dr. J. H. Dingman, H. O., Madalin, N. Y. (Well.)	1,000 organisms per c. c..	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 10	Water............	Dr. Louis A. Harris, H. O., Newburgh, N. Y. (Cistern.)	2,500 organisms per c. c..	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 14	Water............	Dr. Wm. H. Jessup, H. O., Newark, N. Y. (Well.)	1,000 organisms per c. c..	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 14	Water............	Dr. W. H. Snyder, H. O., Newburgh, N. Y. (Well.)	5,000 organisms per c. c..	Gelatin plates liquefied..	Positive.....	There is evidence of organic pollution.
Sept. 14	Water............	Dr. W. W. Davis, H. O., Chester, N. Y. (Well.)	5,000 organisms per c. c.	101,000 organisms per c. c.	Positive.....	There is evidence of organic pollution.
Sept. 15	Water............	Dr. John I. Cotter, H. O., Campbell Hall, N. Y. (Cistern.)	5,000 organisms per c. c.	1,000 organisms per c. c.. and were slightly liquefied.	Negative....	No evidence of organic pollution.
Sept. 17	Water............	Dr. I. C. Washburn, H. O., Chatham, N. Y. (Reservoir.)	200 organisms per c. c...	500 organisms per c. c...	Negative....	No evidence of organic pollution.
Sept. 17	Water............	Dr. Geo. N. Jack, H. O., Depew, N. Y. (Well)	5,000 organisms per c. c..	20,000 organisms per c. c.	Negative....	No evidence of organic pollution.
Sept. 17	Water............	Dr. C. D. Welch, H. O., Castleton, N. Y. (Village supply—Faucet.)	100 organisms per c. c...	10,000 organisms per c. c.	Negative....	No evidence of organic pollution.
Sept. 17	Water, No. 1......	Dr. G. R. Little, H. O., Schaghticoke, N. Y. (Well.)	500 organisms per c. c...	1,000 organisms per c. c..	Negative....	No evidence of organic pollution.
Sept. 17	Water, No. 2	Dr. G. R. Little, H. O., Schaghticoke, N. Y. (Spring.)	2,000 organisms per c. c..	25,000 organisms per c. c. and were slightly liquefied.	Negative....	No evidence of organic pollution.
Sept. 17	Water, No. 3......	Dr. G. R. Little, H. O. Schaghticoke, N. Y. (Spring, No. 2.)	500 organisms per c. c...	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 17	Water............	Dr F. D. Stone, H. O., Palermo, N. Y. (Well.)	20,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 19	Water............	Dr. R. G. Feek, H. O., Brushton, N. Y. (Well.)	10,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 19	Water............	Dr. Wm. Taylor, H. O., Canastota, N. Y. (Well.)	20,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 19	Water, No. 1......	Dr. W. D. Russell, H O., New Hartford, N.Y. (Well, Hooks.)	7,000 organisms per c. c..	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 19	Water, No. 2......	Dr. W. D. Russell, H. O., New Hartford, N. Y. (Well, 5 p. m., Sept. 13th.)	1,000 organisms per c. c..	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

DATE OF REPORT.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Sept. 19	Water, No. 3......	Dr. W. D. Russell, H. O., New Hartford, N. Y. (Well, 9 p. m., Sept. 13th.)	1,000 organisms per c. c..	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 19	Water, No. 4......	Dr. W. D. Russell, H. O., New Hartford, N. Y. (Reservoir.)	200 organisms per c. c....	20,000 organisms per c. c.	Positive.....	There is evidence of organic pollution.
Sept. 19	Water, No. 5......	Dr. W. D. Russell, H. O., New Hartford, N. Y. (Well, 6 a. m., Sept. 14th.)	10,000 organisms per c. c.	25,000 organisms per c. c.	Positive.....	There is evidence of organic pollution.
Sept. 19	Water, No. 6......	Dr. W. D. Russell, H. O., New Hartford, N. Y. (Well, 6 a. m., Sept. 14th.)	200 organisms per c. c...	10,800 organisms per c. c.	Negative....	No evidence of organic pollution.
Sept. 20	Water, No. 1......	Dr. Wm. Taylor, H. O., Canastota, N. Y. (Well, taken 4.30 p. m.)	1,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 20	Water, No. 2......	Dr. Wm. Taylor, H. O., Canastota, N. Y. (Well, taken 3 p. m.)	500 organisms per c. c...	Gelatin plates liquefied, with slight odor.	Negative....	No evidence of organic pollution.
Sept. 20	Water...........	Dr. B. J. Leahy, H. O., Port Jervis, N. Y. (Stream.)	10,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 20	Water...........	Dr. E. H. Madison, H. O., Belfast, N. Y. (Spring.)	5,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 22	Water, No. 1......	Dr. G. R. Wheeler, H. O., East Bloomfield, N. Y. (Tamblin pond.)	4,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 22	Water, No. 2......	Dr. G. R. Wheeler, H. O., East Bloomfield, N. Y. (Melted ice.)	1,000 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.
Sept. 22	Water, No. 3......	Dr. G. R. Wheeler, H. O., East Bloomfield, N. Y. (Well.)	2,500 organisms per c. c.	Gelatin plates liquefied..	Negative....	No evidence of organic pollution.

Sept. 22	Water, No. 1	Dr. S. A. Kemp, H. O., Callicoon, N. Y. (Well.)	10,000 organisms per c. c.	Gelatin plates liquefied	Positive	There is evidence of organic pollution.
Sept. 22	Water, No. 2	Dr. S. A. Kemp, H. O., Callicoon, N. Y. (Brook.)	2,000 organisms per c. c.	Gelatin plates liquefied	Negative	No evidence of organic pollution.
Sept. 27	Water	Dr. A. H. Schonger, H.O., North Branch, N. Y. (Reservoir.)	10,000 organisms per c. c.	1,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 27	Water	Dr. Wm. J. Burns, H. O., Sea Cliff, N.Y. (Faucet.)	1,000 organisms per c. c.	20,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 27	Water, No. 1	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (At intake pipe.)	500 organisms per c. c.	1,000 organisms per c. c.	Negative	No evidence of organic pollution
Sept. 27	Water, No. 2	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Lake 2 miles above creek.)	5,000 organisms per c. c.	1,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 27	Water, No. 3	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Out in lake above creek.)	20,000 organisms per c. c.	10,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 27	Water, No. 4	Dr. G. E. Ellis, H. O., Dunkirk, N.Y. (Lake below creek.)	2,500 organisms per c. c.	5,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 27	Water, No. 5	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Harbor.)	1,000 organisms per c. c.	2,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 27	Water	Dr. D. E. Lake, H. O., Fulton, N. Y. (Well.)	1,500 organisms per c. c.	2,500 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 29	Water	Dr. H. T. Kurtz, H. O., Highland Falls, N.Y. (Well pump.)	8,000 organisms per c. c.	1,500 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 29	Water	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Creek.)	400 organisms per c. c.	1,500 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 29	Water, No. 1	Dr. W. T. Clute, H. O., Schenectady, N. Y.	5,000 organisms per c. c.	10,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 29	Water, No. 2	Dr. W. T. Clute, H. O., Schenectady, N. Y.	2,000 organisms per c. c.	8,000 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 29	Water, No. 3	Dr. W. T. Clute, H. O., Schenectady, N. Y.	500 organisms per c. c.	100 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 29	Water, No. 1	Dr. B. J. Leahy, H. O., Port Jervis, N. Y. (Well, No. 1.)	800 organisms per c. c.	2,500 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 29	Water, No. 2	Dr. B. J. Leahy, H. O., Port Jervis, N. Y. (Well, No. 2.)	200 organisms per c. c.	500 organisms per c. c.	Negative	No evidence of organic pollution.
Sept. 29	Water. No. 3	Dr. B. J. Leahy, H. O., Port Jervis, N. Y. (Well, No. 3.)	10,000 organisms per c. c.	40,000 organisms per c. c.	Positive	There is evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

DATE OF REPORT.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Sept. 29	Water, No. 4	Dr. B. J. Leahy, H. O., Port Jervis, N. Y. (Well, No. 4.)	40,000 organisms per c. c.	10,000 organisms per c. c.	Positive	There is evidence of organic pollution.
Sept. 29	Water, No. 5	Dr. B. J. Leahy, H. O., Port Jervis, N. Y.	20,000 organisms per c. c.	5,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 4	Water, No. 1	Dr. Wallace Clarke, H. O., Utica, N. Y. (Hinkley intake from new water supply.)	500 organisms per c. c.	1,000 organisms per c. c.	Positive	The colon bacillus was isolated in pure culture. This specimen stood 48 hours before it was examined.
Oct. 4	Water, No. 2	Dr. Wallace Clarke, H. O., Utica, N. Y. (Deerfield reservoir, after treatment by sulphate aluminum.)	100 organisms per c. c.	2,000 organisms per c. c.	Negative	Unable to procure culture of colon bacillus from plates. More satisfactory than No. 1.
Oct. 4	Water	Dr. F. F. Williams, H. O., Canton, N. Y. (Well.)	500 organisms per c. c.	4,000 organisms per c. c.	Positive	There is indication that the water is polluted.
Oct. 4	Water, No. 1	Dr. Robt. J. Carroll, H. O., Red Hook, N. Y. (Well.)	2,000 organisms per c. c.	5,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 4	Water, No. 2	Dr. Robt. J. Carroll, H. O., Red Hook, N. Y. (Spring.)	1,000 organisms per c. c.	1,500 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 5	Water, No. 1	Dr. W. Taylor, H. O., Canastota, N. Y. (Well No. 1.)	500 organisms per c. c.	1,200 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 5	Water, No. 2	Dr. W. Taylor, H. O., Canastota, N. Y. (Faucet, specimen No. 2.)	1,000 organisms per c. c.	25,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 5	Water, No. 3	Dr. W. Taylor, H. O., Canastota, N. Y. (Well, specimen No. 3.)	800 organisms per c. c.	25,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 5	Water, No. 4	Dr. W. Taylor, H. O., Canastota, N. Y. (C. J. Packer well, specimen No. 4.)	200 organisms per c. c.	500 organisms per c. c.	Negative	No evidence of organic pollution.

Oct. 5	Water	Dr. E. W. Bryan, H. O., Corning, N. Y. (Well.)	500 organisms per c. c.	4,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 6	Water	Dr. S. W. Nelson, H. O., Old Forge, N. Y. (Driven well.)	800 organisms per c. c.	4,000 organisms per c. c.	Positive	There is evidence of organic pollution.
Oct. 6	Water, No. 1	Dr. B. S. McCabe, H. O., Greenville, N. Y. (Reservoir.)	25,000 organisms per c. c.	Liquefaction	Negative	There is no evidence of organic pollution, although the bacterial count is rather high.
Oct 6	Water, No. 2	Dr. B. S. McCabe, H. O., Greenville, N. Y. (Driven well.)	30,000 organisms per c. c.	Gelatin plates liquefied	Negative	No evidence of organic pollution, although the bacterial count is rather high.
Oct. 6	Water	Dr. W. F. Smeltzer, H. O., Bergen, N. Y. (Well.)	400 organisms per c. c.	200 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 8	Water	Dr. Geo. P. H. Taylor, H. O., Stillwater, N. Y. (Surface well.)	5,000 organisms per c. c.	5,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 8	Water	Dr. F. A. Smith, H. O., Corinth, N. Y. (Village hydrant.)	300 organisms per c. c.	1,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 8	Water	Dr. Chas. E. Davis, H. O., Mecklenburg, N. Y. (Well.)	500 organisms per c. c.	10,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 8	Water, No. 1	Dr. E. H. Madison, H. O., Belfast, N. Y. (Spring conducted in pipes to cement cistern, water supply of Merritt Parker.)	1,000 organisms per c. c.	30,000 organisms per c. c.	Positive	There is evidence of organic pollution.
Oct. 8	Water, No. 2	Dr. E. H. Madison, H. O., Belfast, N. Y. (Driven well of R. B. Estabrook.)	100 organisms per c. c.	500 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 8	Water, No. 3	Dr. E. H. Madison, H. O., Belfast, N. Y. (Driven well on public highway.)	1,000 organisms per c. c.	3,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 10	Water, No. 1	Dr. W. A. Smith, H. O., Newfield, N. Y. (Well, taken 3 p. m.)	25,000 organisms per c. c.	40,000 organisms per c. c.	Positive	There is evidence of organic pollution.
Oct. 10	Water, No. 2	Dr. W. A. Smith, H. O., Newfield, N. Y. (Well, taken 10 a.m.)	2,000 organisms per c. c.	1,500 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 10	Water	Dr. S. Pashley, H. O., Hartford, N. Y. (Well.)	1,000 organisms per c. c.	2,500 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 11	Water	Dr. C. W. Geel, H. O., Berlin, N. Y. (Well.)	2,500 organisms per c. c.	200 organisms per c. c.	Negative	No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Continued*).

DATE OF REPORT.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Oct. 12	Water, No. 1......	Dr. Chas. E. Davis, H. O., Mecklenburg, N. Y. (Well, No. 1, C. T. Jones.)	300 organisms per c. c...	200 organisms per c. c...	Negative....	No evidence of organic pollution.
Oct. 12	Water, No. 2......	Dr. Charles E. Davis, H. O., Mecklenburg, N. Y. (Well, No. 2, C. T. Jones.)	3,000 organisms per c. c.	2,000 organisms per c. c.	Positive.....	There is evidence of organic pollution.
Oct. 15	Water............	Dr. Wallace Clarke, H. O., Utica, N. Y. (Faucet.)	10,000 organisms per c. c.	6,240 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 15	Water............	Dr. E. E. Eddy, H. O., Redwood, N. Y. (Well.)	12,000 organisms per c. c.	16,248 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 15	Water............	Dr. Stuart W. Nelson, H. O., Old Forge, N. Y. (Well.)	30,000 organisms per c. c.	10,000 organisms per c. c.	Positive.....	There is evidence of organic pollution.
Oct. 15	Water, No. 1......	Dr. A. G. Wilding, H. O., Malone, N. Y. (Well, 48 ft. deep, on Edward st.)	1,800 organisms per c. c.	500 organisms per c. c...	Negative....	No evidence of organic pollution.
Oct. 15	Water, No. 2......	Dr. A. G. Wilding, H. O., Malone, N. Y. (Well, on William st.)	20,000 organisms per c. c.	15,200 organisms per c. c., and were slightly liquefied.	Negative....	No evidence of organic pollution, although the bacterial count is rather high.
Oct. 15	Water............	Dr. J. R. Waterman, H. O., Centerville, N. Y. (Driven well.)	1,200 organisms per c. c.	2,000 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 17	Water, No. 1......	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Intake pipe.)	20,000 organisms per c. c.	18,960 organisms per c. c.	Negative....	No evidence of organic pollution, although the bacterial count is rather high.
Oct. 17	Water, No. 2......	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Lake just off from creek.)	40,000 organisms per c. c.	28,400 organisms per c. c.	Negative....	No evidence of organic pollution, although the bacterial count is rather high.
Oct. 17	Water, No. 3......	Dr. G. E. Ellis, H. O., Dunkirk, N. Y. (Lake below creek.)	25,000 organisms per c. c.	30,000 organisms per c. c.	Negative....	No evidence of organic pollution although the bacterial count is rather high.

Oct. 17	Water	Dr. Wallace Clarke, H. O., Utica, N. Y. (Reservoir at Deerfield, Hinckley.)	856 organisms per c. c.	2,500 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 19	Water	Dr. H. G. Germer, H. O., Canastota, N. Y. (Well.)	15,860 organisms per c. c.	Gelatin plates liquefied		The colon bacillus was isolated in pure culture. There is evidence of organic pollution.
Oct. 19	Water, No. 1	Dr. E. H. Madison, H. O., Belfast, N. Y. (Spring.)	1,100 organisms per c. c.	2,000 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 19	Water, No. 2	Dr. E. H. Madison, H. O., Belfast, N. Y. (Driven well.)	500 organisms per c. c.	1,880 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 19	Water	Dr. E. W. Bryan, H. O., Corning, N. Y. (Well.)	12,500 organisms per c. c.	30,000 organisms per c. c.	Positive	There is evidence of organic pollution.
Oct. 23	Water	Dr. A. S. Rust, Brushton, N. Y.	2,800 organisms per c. c.	3,650 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 23	Water, No. 1	Dr. R. F. Medrick, H. O., Port Jervis, N. Y. (Reservoir No. 1.)	1,400 organisms per c. c.	2,240 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 23	Water, No. 2	Dr. R. F. Medrick, H. O., Port Jervis, N. Y. (Reservoir No. 2.)	1,600 organisms per c. c.	3,500 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 23	Water, No. 3	Dr. R. F. Medrick, H. O., Port Jervis, N. Y. (Reservoir No. 3.)	200 organisms per c. c.	340 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 23	Water, No. 4	Dr. R. F. Medrick, H. O., Port Jervis, N. Y. (Faucet in village.)	100 organisms per c. c.	280 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 23	Water	Dr. W. H. Dewing, H. O., Clayville, N. Y.	7,000 organisms per c. c.	Gelatin plates liquefied	Negative	No evidence of organic pollution.
Oct. 26	Water	Dr. D. H. MacKenzie, H. O., Millbrook N. Y. (Well.)	1,800 organisms per c. c.	2,050 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 26	Water	Dr. G. B. Ingalls, H.O., Mayfield, N. Y. (Spring.)	5,000 organisms per c. c.	7,325 organisms per c. c	Positive	There is evidence of organic pollution.
Oct. 26	Water	Dr. J. C. Clark, H. O., Olean, N. Y. (Faucet.)	1,200 organisms per c. c.	4,320 organisms per c. c.	Negative	No evidence of organic pollution.
Oct. 26	Water	Dr. C. A. Ellis, H. O., Sherman, N. Y. (Public well.)	500 organisms per c. c.	820 organisms per c. c.	Negative	No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER — (*Continued*).

DATE OF REPORT.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Oct. 26	Water, No. 1......	Dr. George Ellis, H. O., Dunkirk, N.Y. (Dug well.)	12,000 organisms per c. c.	20,200 organisms per c. c.	Negative....	No evidence of organic pollution, although the bacterial count is rather high.
Oct. 26	Water, No. 2......	Dr. George Ellis, H. O., Dunkirk, N. Y. (Spring.)	1,600 organisms per c. c.	3,700 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 26	Water, No. 1......	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Faucet.)	1,500 organisms per c. c.	4,820 organisms per c. c.	Negative....	No evidence oı organic pollution.
Oct. 26	Water, No. 2......	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Well, dated Oct. 18.)	1,000 organisms per c. c.	3,640 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 26	Water, No. 3......	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Cistern.)	10,000 organisms per c. c.	2,500 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 26	Water, No. 4......	Dr. Wm. T. Clute, H. O., Schenectady, N. Y. (Well, dated Oct. 22.)	1,200 organisms per c. c.	800 organisms per c. c...	Negative....	No evidence of organic pollution.
Oct. 26	Water............	Dr. A. Letellier, H. O., Seneca Falls, N. Y. (Pump.)	5,000 organisms per c. c.	6,780 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 30	Water............	Dr. C. F. Roberts, H. O., Dover Plains, N. Y. (Well.)	1,800 organisms per c. c.	1,200 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 30	Water, No. 1......	Dr. A. C. Knapp, H. O., Dryden, N. Y. (East well.)	25,000 organisms per c. c.	10,800 organisms per c. c.	Positive.....	There is evidence of organic pollution.
Oct. 30	Water, No. 2......	Dr. A. C. Knapp, H. O., Dryden, N. Y. (West well.)	4,520 organisms per c. c.	6,850 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 30	Water, No. 3......	Dr. A.C. Knapp, H. O., Dryden, N. Y. (Village water—faucet.)	4,650 organisms per c. c.	5,080 organisms per c. c.	Negative....	No evidence of organic pollution.
Oct. 30	Water............	Dr. Chas. E. Davis, H. O., Mecklenburg, N. Y. (Well.)	1,860 organisms per c. c.	2,420 organisms per c. c.	Negative....	There is no evidence of organic pollution.

Nov. 1	Water, No. 1......	Dr. W. D. Russell, H. O., New Hartford, N. Y. (City water—faucet.)	6,620 organisms per c. c.	18,000 organisms per c. c.	Negative....	No evidence of organic pollution, but the bacterial count is rather high.
Nov. 1	Water, No. 2......	Dr. W. D. Russell, H. O., New Hartford, N. Y. (Morris well.)	30,000 organisms per c. c.	26,450 organisms per c. c.	Negative....	No evidence of organic pollution, but the bacterial count is rather high.
Nov. 1	Water, No. 3......	Dr. W. D. Russell, H. O., New Hartford, N. Y. (McCarthy well.)	10,875 organisms per c. c.	15,800 organisms per c. c.	Negative....	No evidence of organic pollution, but the bacterial count is rather high.
Nov. 1	Water............	Dr. O. H. Lawrence, H. O., Waverly, N. Y. (Reservoir.)	50 organisms per c. c....	30 organisms per c. c....	Negative....	No evidence of organic pollution.
Nov. 1	Water............	Dr. R. G. Feek, H. O., Brushton, N. Y. (Well.)	6,280 organisms per c. c.	5,420 organisms per c. c.	Negative....	No evidence of organic pollution.
Nov. 9	Water............	Dr. G. D. Bradford, H. O., Homer, N. Y.	2,560 organisms per c. c.	2,860 organisms per c. c.	Negative....	No evidence of organic pollution.
Nov. 9	Water............	Dr. W. H. Jessup, H. O., Newark, N.Y. (Well.)	23,680 organisms per c. c.	32,720 organisms per c. c.	Positive.....	A black sediment was present. There is evidence of organic pollution.
Nov. 9	Water............	Dr. B. J. Leahy, H. O., Port Jervis, N. Y. (Well.)	6,880 organisms per c. c.	5,280 organisms per c. c.	Negative....	There is no evidence of organic pollution.
Nov. 11	Water............	Dr. Thos. E. Spalding, H. O., Salamanca, N. Y. (Faucet.)	7,650 organisms per c. c.	8,960 organisms per c. c.	Negative....	No evidence of organic pollution.
Nov. 11	Water............	Dr. Wallace Clark, H. O., Utica, N. Y. (Reservoir at Deerfield.)	8,000 organisms per c. c.	650 organisms per c. c...	Negative....	No evidence of organic pollution.
Nov. 12	Water, No. 1......	Dr. O. H. Mott, H. O., Ft. Edward, N. Y. (Faucet—taken at 4.10 p. m.)	2,500 organisms per c. c.	3,480 organisms per c. c.	Negative....	No evidence of organic pollution.
Nov. 12	Water, No. 2......	Dr. O. H. Mott, H. O., Ft. Edward, N. Y. (Faucet—taken 4.20 p. m.)	18,600 organisms per c. c.	20,000 organisms per c. c.	Negative....	No evidence of organic pollution, although the bacterial count is rather high.
Nov. 12	Water, No. 3......	Dr. O. H. Mott, H. O., Ft. Edward, N. Y. (Reservoir — taken 3.26 p. m.)	1,200 organisms per c. c.	1,680 organisms per c. c.	Negative....	No evidence of organic pollution.
Nov. 13	Water............	Dr. D. E. Lake, H. O., Fulton, N. Y. (Well.)	600 organisms per c. c...	720 organisms per c. c...	Negative....	No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER — (*Continued*).

Date of Report.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Nov. 13	Water	Dr. A. Letellier, H. O., Seneca Falls, N. Y. (Pump in well.)	1,200 organisms per c. c.	800 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 13	Water	Dr. Thos. E. Spalding, H. O., Salamanca, N. Y. (Well, Sander's.)	1,100 organisms per c. c.	1,640 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 13	Water	Dr. O. H. Mott, H. O., Fort Edward, N. Y. (McIntyre reservoir.)	1,200 organisms per c. c.	980 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 14	Water, No. 1	Dr. F. P. Sinclair, H. O., Lysander, N. Y. (Well, taken 12.30 p. m., Nov. 3.)	200 organisms per c. c.	670 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 14	Water, No. 2	Dr. F. P. Sinclair, H. O., Lysander, N. Y. (Well, taken 10 a. m., Nov. 5.)	300 organisms per c. c.	490 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 14	Water, No. 3	Dr. F. P. Sinclair, H. O., Lysander, N. Y. (Home well.)	1,000 organisms per c. c.	1,260 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 14	Water, No. 4	Dr. F. P. Sinclair, H. O., Lysander, N. Y. (Schoolhouse and family well.)	400 organisms per c. c.	150 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 17	Water	Dr. W. U. Taylor, H. O., Mooers, N. Y. (Well.)	3,080 organisms per c. c.	6,740 organisms per c. c.	Positive	There is evidence of organic pollution.
Nov. 20	Water	Dr. Chas. Prest, H. O., Waterford, N. Y. (Well.)	7,000 organisms per c. c.	9,000 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 20	Water, No. 1	Dr. M. B. Hutton, H. O., Valley Falls, N. Y. (Running spring.)	6,760 organisms per c. c.	2,520 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 20	Water, No. 2	Dr. M. B. Hutton, H. O., Valley Falls, N. Y. (Well.)	18,760 organisms per c. c.	12,000 organisms per c. c.	Negative	No evidence of organic pollution, although the bacterial count is rather high.

Nov. 20	Water	Dr. E. W. Janes, H. O., Hamburg, N. Y. (Well.)	10,000 organisms per c. c.	12,600 organisms per c. c.	Negative	No evidence of organic pollution, although the bacterial count is rather high.
Nov. 26	Water	Dr. W. L. Ayer, H. O., Owego, N. Y. (Well.)	1,800 organisms per c. c.	1,500 organisms per c. c.	Positive	There is evidence of organic pollution.
Nov. 26	Water	Dr. G. S. Carpenter, H. O., Waverly, N. Y. (Pempleton's pond.)	500 organisms per c. c.	750 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 28	Water	Dr. N. A. Taylor, H. O., Mooers, N. Y. (Well.)	4,750 organims per c. c.	6,520 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 30	Water	Dr. G. D. Barrett, H. O., Clyde, N. Y. (Well.)	1,800 organisms per c. c.	2,420 organisms per c. c.	Positive	There is evidence of organic pollution.
Nov 30	Water, No. 1	Dr. A. O. Squire, H. O., Ossining, N. Y. (Ice pond.)	2,500 organisms per c. c.	3,060 organisms per c. c.	Negative	No evidence of organic pollution.
Nov. 30	Water, No. 2	Dr. A. O. Squire, H. O., Ossining, N. Y. (Stream used by school for drinking purposes.)	860 organisms per c. c.	780 organisms per c. c.	Negative	No evidence of organic pollution.
Dec. 3	Water	Dr. E. E. Billings, H. O., Gilboa, N. Y. (Well.)	40,000 organisms per c. c.	28,760 organisms per c. c.	Positive	There is evidence of organic pollution.
Dec. 3	Water, No. 1	Dr. Wallace Clarke, H. O., Utica, N. Y.	3,800 organisms per c. c.	2,800 organisms per c. c.	Negative	No evidence of organic pollution.
Dec. 3	Water, No. 2	Dr. Wallace Clarke, H. O., Utica, N. Y.	2,480 organisms per c. c.	1,840 organisms per c. c.	Negative	No evidence of organic pollution.
Dec. 7	Water	Dr. J. P. J. Cummins, H. O., Ticonderoga, N. Y. (Pump in artesian well.)	18,600 organisms per c. c.	20,560 organisms per c. c.	Negative	No evidence of organic pollution, although the bacterial count is rather high.
Dec. 7	Water	Dr. C. W. Geel, H. O., Berlin, N. Y. (Spr'g.)	2,000 organisms per c. c.	500 organisms per c. c.	Negative	No evidence of organic pollution.
Dec. 10	Water	Dr. Garry Mount, H. O., South Butler, N. Y. (Well.)	800 organisms per c. c.	1,000 organisms per c. c.	Negative	No evidence of organic pollution.
Dec. 14	Water	Dr. John L. Hazen, H. O., Brockport, N. Y. (Well.)	1,800 organisms per c. c.	1,800 organisms per c. c.	Negative	No evidence of organic pollution.
Dec. 21	Water	Dr. E. W. Witt, H. O., Brownville, N. Y. (Well in rear of schoolhouse.)	560 organisms per c. c.	820 organisms per c. c.	Negative	No evidence of organic pollution.

BACTERIOLOGICAL EXAMINATIONS OF WATER—(*Concluded*).

DATE OF REPORT.	Specimen.	Received from.	Agar plates showed.	Gelatin plates showed.	Presumptive test for B. coli.	Remarks.
1906. Dec. 31	Water	Dr. E. D. Williams, H. O., East Otto, N. Y. (Drove well.)	620 organisms per c. c.	....	Negative	No evidence of organic pollution.
Dec. 31	Water, No. 1	Dr. Geo. D. Bradford, H. O., Homer, N. Y. (Public water supply taken 12 a. m.)	420 organisms per c. c.	200 organisms per c. c.	Negative	No evidence of organic pollution.
Dec. 31	Water, No. 2	Dr. Geo. D. Bradford, H. O., Homer, N. Y. (Public water supply taken 11 a. m.)	200 organisms per c. c.	700 organisms per c. c.	Negative	No evidence of organic pollution.

REPORT OF BUREAU OF CHEMISTRY

REPORT OF WILLIS G. TUCKER, M.D., Ph.D.,

Director Bureau of Chemistry

DR. EUGENE H. PORTER, *Commissioner, New York State Department of Health, Albany, N. Y.:*

DEAR SIR:— During the year ended December 31, 1906, nineteen samples of water, one sample of sewage effluent, and various miscellaneous articles have been examined and reported upon. These reports, if not appearing elsewhere, are herein included.

A summary of the work done during the year is as follows:

January 12. Reported as follows on the examination of a sample of powder sold for use as a water purifier:

ALBANY, *January* 12, 1906.

DR. EUGENE H. PORTER, *Commissioner, New York State Department of Health, Capitol, Albany, N. Y.:*

DEAR SIR:— In compliance with your instructions of November 29, 1905, I have examined the sample of powder said to be sold by a druggist in Auburn as a water purifier and which had been sent to you by Dr. A. H. Brown, health officer of Auburn, N. Y., and we find it to consist essentially of a mixture of finely divided carbon and phosphate of lime. It is evidently pulverized boneblack and may contain some added lime, though some lime is normally found in recently burned bone, derived from its calcium carbonate. I have not found any copperas, alum, copper sulphate, borax, nor any harmful or poisonous compound, and, therefore, conclude that the use of this preparation would not have any harmful effect. On the other hand I am very far from believing

that its use could be depended upon to purify a polluted water. Undoubtedly it does effect some improvement in the appearance of a water in which it is used, but such an improvement is not always accompanied by a safe purification.

Very respectfully yours,

WILLIS G. TUCKER,
Director

January 15. Reported as follows on analysis of two samples of water and one of effluent from Brockport. (For analyses of the waters see tabulated water analyses at end of report):

ALBANY, *January* 15, 1906.

DR. EUGENE H. PORTER, *Commissioner, New York State Department of Health, Albany, N. Y.:*

DEAR SIR:— Enclosed you will find reports in duplicate on the analysis of two samples of water and one sample described as an effluent, sent by Mr. Seymour from Brockport, and received on December 28, 1905.

The samples are in the main similar to those from the same sources reported upon to you on December 22, 1905, but there is a noticeable increase in the amounts of some of the constituents in the samples, to which attention is called in the several reports.

Very respectfully yours,

WILLIS G. TUCKER,
Director

SEWAGE EFFLUENT, No. 919.

(Results are parts in 100,000.)

Received from A. H. Seymour, from Brockport, N. Y. Date received, December 28, 1905. Source, "effluent." How labelled, "No. 2." Appearance: Color, light yellowish-green tint; turbidity, none; sediment, slight. Odor at 100 deg. F., very slight. Chlorine in chlorides, 4.20; free ammonia, 0.4050; albuminoid ammonia, 0.0850; nitrogen as nitrites, 0.0909; nitrogen as

nitrates, 0.3772; total solids, 52.80; loss on ignition, 10.80; behavior during ignition, darkened; mineral matter, 42.00.

Remarks: Appearance, good; chlorine, free and albuminoid ammonia; nitrites and nitrates, higher than in sample analyzed previously and reported upon December 22, 1905.

March 22. Reported as follows on sample of sliced beef thought to have occasioned illness:

Albany, *March* 22, 1906.

Dr. Eugene H. Porter, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:— Regarding the sample of "Beech-Nut Sliced Beef" received from you yesterday with letters concerning same from Dr. G. S. La Moree, health officer of the town of Lloyd, Ulster county, and from the "Beech-Nut Packing Company," of Canajoharie, N. Y., I would say that in my opinion if illness has resulted from eating meats packed as is this sample in glass jars with tin tops, it is more likely to have been occasioned by decomposition products in the contents, resulting from incipient putrefaction, than from metallic impregnation due to contact of the contents with the cover or lid. Nevertheless I think it would be neater and safer if such contact was prevented by the use of paraffined paper or some similar device. I note that the packing company say in their letter to Dr. La Moree that the cap is enamelled inside, but I am unable to discern any evidence of such enamelling in the cover of the sample submitted to me, and I should not consider such treatment as this particular cap may have received as affording adequate protection to the contents of the package.

The letters sent to me are returned herewith.

Very respectfully yours,

WILLIS G. TUCKER,

Director

May 10. Reported as follows on examination of a sample of cheese the eating of which was reported to have caused illness:

ALBANY, *May* 10, 1906.

DR. EUGENE H. PORTER, *Commissioner, New York State Department of Health, Albany, N. Y.:*

DEAR SIR:— On the 23d of April last I received by your order and through the Bender Laboratory a sample of cheese which had been forwarded by Dr. D. Norwood, health officer of the village of Esperance, N. Y., with instructions from you to examine the same. A letter from Dr. Norwood, which accompanied the sample, stated that it was alleged that this cheese had been eaten and had caused severe illness in numerous cases.

The sample consisted of a square slice weighing about half a pound of American dairy cheese. It showed considerable mould, both green mould which penetrated the cheese, and white mould upon the surface. Its odor was sharp, acrid and disagreeable.

As there was a possibility that some irritant metallic poison had been intentionally added, or in some manner accidently contaminated the cheese, I examined it for such, but discovered no evidence of the presence of arsenic, antimony or other metallic poison. Nor was any distinct evidence of the presence of any toxic putrefactive product obtained, but the isolation of such products and their identification is attended with many difficulties. In my opinion, however, the illnesses ascribed to the use of this cheese have in all probability resulted from the development in the same of some such products. This is a danger to which the public is constantly exposed and against which it is well-nigh impossible to guard. I should advise that the sale of the remainder of this cheese be forbidden.

Very respectfully yours,

WILLIS G. TUCKER,
Director

May 25. Reported as follows on the analysis of an effervescing preparation sold for use as a drink which was thought to have caused illness:

ALBANY, *May* 25, 1906.

DR. EUGENE H. PORTER, *Commissioner, New York State Depart ment of Health, Albany, N. Y.:*

DEAR SIR:— On the 14th instant I received from you a sample referred to as "ingredients used in making root-beer" and so described by the sender, which had been forwarded to you by Dr. C. D. McCarthy, health officer, Geneva, N. Y., together with a letter from him relating to the same, and your instructions to examine and report upon the sample submitted as speedily as possible.

Dr. McCarthy's letter states that a lad, twelve years old and in apparent good health, bought a package similar to the samples forwarded by him, and on May 12 mixed the contents with a glass of water as directed on the package and drank it at about 11 A. M. He ate dinner with the family and went to a ball game in the afternoon but did not enter into the play. He was taken ill about 3 P. M., and started for home, a mile distant, "and on the way home his legs became so weak that he was obliged to sit down frequently and fell down twice." On arriving at home he was taken violently ill; vomited his undigested dinner and had a movement of the bowels. His parents gave him a dose of salts but vomiting was persistent and it was not retained. Dr. McCarthy states that he was called to see him about 11 P. M., and found him delirious, with a temperature of 104½ degrees and a pulse of 120, and vomiting frequently. He prescribed a dose of calomel and bicarbonate of soda which was not retained, and afterward washed out the bowels. "At 3:30 he went into a comatose condition and died at 4:40 A. M., May 13." Since Dr. McCarthy observed that none of the other members of the family who ate the same dinner were affected he seems inclined to infer that the powder might have occasioned his illness and death. He does not state that any autopsy was performed nor give any suggestion as to a possible diagnosis, nor further reasons for his apparent inference that a

powder similar to those submitted may have been the cause of the fatal result.

The preparation submitted to me consists of two similar packages, or cartons, of pasteboard, cylindrical in shape, an inch and a half in length and half an inch in diameter, wrapped in paper on which was printed:—"Klemm's Cream Chocolate Mint. * * * Dissolve contents in a glass of ice water, stir well, and it is ready to drink. Klemm Extract Co., Chicago."

Each of these packages contained a brown powder at one end and a light colored powder in smaller volume at the other. On examination I find that the brown powder consists essentially of cocoa (chocolate), sugar, aromatics, and bicarbonate of soda, and the light colored powder of tartaric acid. Such a mixture when added to water will effervesce, and these constituents are in no way harmful or objectionable. The Klemm Extract Co., as I am informed by Mr. George E. Hurd, Ph. G., who has written me in response to an inquiry, and says that he made all of the "Chocolate Mint" ever sold, has practically gone out of business, but he states that before the novelty wore off they "sold over ten million packages and never heard of a case of injury from their use." His statement as to the constituents agrees with the results of my examination in all essential respects. None of these constituents, discovered by me or asserted to be present by the makers, can be considered as harmful in any respect.

There being a possibility that some irritant metallic poison might have gained access to the powders, or been intentionally and criminally added thereto, I made further examination with this possibility in view but found no trace of arsenic, antimony nor mercury in them, and it is highly improbable that any irritant inorganic poison, unless taken in very large quantity and retained, could have produced such violent symptoms as are said to have occurred in this case.

The quantity of material supplied me being small, no further examination could be made but, in my opinion, further examination is unnecessary. I find nothing in this preparation of a harmful character or which could in any way account for the symptoms described, and while I am unable to suggest a probable cause of

death, which indeed lies outside my proper province, I am distinctly of the opinion that the fatal termination in this instance was in no way the result of the drink prepared from this preparation and that some other explanation must be sought if further investigation is to be made.

Very respectfully yours,

WILLIS G. TUCKER,
Director

June 9. Report on analysis of sample of water from New Rochelle (which see under tabulated water analyses) was accompanied by the following recommendation:

ALBANY, *June* 9, 1906.

DR. EUGENE H. PORTER, *Commissioner, New York State Department of Health, Albany, N. Y.:*

DEAR SIR:— I respectfully enclose herewith report in duplicate on the analysis of a sample of well water received by your order on the 6th inst., from W. B. Craft, clerk, department of health, New Rochelle, N. Y. The well is described as "situated fifteen feet from the house and forty feet from the privy" with ground sloping slightly from well to privy; soil sandy and depth of well unknown.

The appearance of the water is good and it is devoid of odor; ammonias are low, nitrites absent and total solids not excessive. Chlorine rather high, and nitrogen in nitrates high. Contamination indicative of past rather than recent pollution but the location of the well is not good and the use of such waters is attended with risk. I should advise a discontinuance of this water for domestic purposes if a better supply is procurable.

Very respectfully yours,

WILLIS G. TUCKER,
Director

October 4. Reported as follows on the examination of a sample of vinegar, the use of which had given rise to numerous cases of acute gastro-enteritis:

ALBANY, *October* 4, 1906.

DR. EUGENE H. PORTER, *Commissioner, New York State Department of Health, Albany, N. Y.:*

DEAR SIR:— On the 14th of September last I received from you an unsealed package, which had apparently previously been sent to the Bender Laboratory by mail, containing a brown glass bottle of about four ounce capacity, labelled: "Vinegar purchased at A. H. Wolcott's, Cortland, N. Y., Sept. 3, 1906. 40–50 cases of acute gastro-enteritis resulting from its use. P. T. Carpenter, Cortland, N. Y., Health Officer." A memorandum contained in the package stated: "Wholesale dealer and manufacturer stated to be Louis Windholz, Syracuse, N. Y."

In compliance with your instructions I have made an examination of the contents of this bottle with the following results:

The fluid contained in the bottle has the color, odor and appearance of cider vinegar.

Specific gravity	1.0218
Acidity, as acetic acid absolute	4.90
Solids	2.72
Ash	0.40
Mineral acids	None.

So far as the above results are concerned they are indicative of a vinegar of satisfactory quality, but on further examination for poisonous metallic compounds I found it to contain arsenic, which fact will account for the illness its use is alleged to have occasioned. Indeed the quantity of arsenic in the sample submitted to me is so large as to render it actively poisonous and the ingestion of such vinegar in any considerable quantity might have been attended with fatal results.

In the fluid contained in the bottle as above described I find arsenic equivalent to 1.211 per cent. of arsenious oxide (As_2O_3) or arsenious acid so called. This quantity is equivalent to about 704.66 grains to the gallon.

As soon as the presence of arsenic was detected and without

waiting to complete my examination and determine its quantity I communicated with Dr. Carpenter, on September 24, advising him to condemn all vinegar of same lot as that submitted to me and forbid its further sale and use, and on the same day I reported to you that I had so advised him and gave reason for so doing. It is scarcely necessary to add that extraordinary pains should be taken to prevent the sale or use of all vinegar of such a nature as that submitted to me and now reported upon.

Very respectfully yours,

WILLIS G. TUCKER,

Director

October 27. Reported as follows on the analysis of a second sample of vinegar from Cortland, which was also found to contain arsenic:

ALBANY, *October* 27, 1906.

DR. EUGENE H. PORTER, *Commissioner, New York State Department of Health, Albany, N. Y.:*

DEAR SIR:— Confirming statement made by telephone on October 22d, and in letter of October 23d, I beg to report that I have examined a sample of vinegar received on October 19th from the Bender Laboratory, contained in a two-ounce bottle which had been forwarded by mail in an unsealed package. The bottle bore the following label: "Buckley's grocery, Sept. 6, '06. Please examine for arsenic as have six or seven cases with same symptoms as those caused by the Wolcott vinegar. This is also Windholz's vinegar. Dr. P. T. Carpenter, Cortland, N. Y., Health Officer."

On examination I find this vinegar, like that received previously from Dr. Carpenter and reported upon on October 4, 1906, to contain arsenic in considerable, though smaller, quantity than previous sample. It contains approximately 0.67 per cent. of arsenic calculated as arsenious oxide, (As_2O_3). As heretofore stated, Dr. Carpenter was promptly notified by telegraph of the presence of arsenic in the sample and as soon as such fact was ascertained.

Very respectfully yours,

WILLIS G. TUCKER,

Director

October 10. Report on analysis of sample of water from Redwood (which see under tabulated water analyses), was accompanied by the following recommendation:

ALBANY, *October* 10, 1906.

DR. EUGENE H. PORTER, *Commissioner, New York State Department of Health, Albany, N. Y.:*

DEAR SIR:— I respectfully enclose herewith report in duplicate on analysis of a sample of water received by your order on the 4th inst., from Dr. E. E. Eddy, Health Officer, Redwood, N. Y. According to the information furnished by Dr. Eddy this well is badly located and two cases of typhoid are stated to exist in families using water from the well. While the analytical results do not indicate gross pollution they are not entirely satisfactory, and under the circumstances, I should recommend that the use of this water for drinking be discontinued for the present; the well cleaned; a subsequent examination of the water made, and a better supply procured, if possible, should a later examination show no improvement in the water.

Very respectfully yours,

WILLIS G. TUCKER,
Director

Water Analyses

During the year nineteen samples of water used for domestic purposes were received, analyzed and reported upon as above stated. The examination has included physical properties (color, turbidity, sediment and odor); chlorine; free and albuminoid ammonias; nitrogen in nitrites and in nitrates; total solids; loss on ignition and behavior during ignition; mineral matter, and other special determinations as deemed necessary in particular cases. The results obtained have been deemed sufficient for determining fitness for domestic use in most instances, especially when construed in connection with the results of the bacteriological examination which has generally been made. To all senders of samples printed instructions for collecting and forwarding samples have

been sent in advance, and in construing the results of the examination the information which has been furnished concerning source of sample, its surroundings and possible contaminations, has been given due weight in forming an opinion as to fitness for use, and this fact will explain why some waters have been condemned which, judged solely by the analytical results, might appear to be of fairly satisfactory quality.

The results of the analyses of the samples in tabular form is appended:

30

WATER EXAMINATIONS —

No.	Received From.	Date.	Source.	How labeled.	Appearance. Color.	Turbidity.	Sediment.	Odor at 100° F.
		1905						
918	A. H. Seymour, Brockport, N. Y.	Dec. 28	From creek 50 feet above outflow of effluent.	No. 1	Greenish-yellow tint.	None	Slight	None
920	A. H. Seymour, Brockport, N. Y.	Dec. 28	Creek, 200 feet below outflow of effluent.	No. 3	Greenish-yellow tint (less than No. 918).	None	Slight	None
		1906						
921	Frank D. Wood, Pres. of the village, Bergen, N. Y.	Feb. 6	Not stated	None	Light greenish tint.	None	Trifling	None
922	Dr. L. H. Smith Palmyra, N. Y.	Feb. 14	From service pipes of village water company.	Specimen of water from service pipes of village water company.	Light greenish tint.	None	Trifling	Aromatic and apparently due to use of old cork from medicine bottle.
923	C. W. Winspear, Supt. State Custodial Asylum, Newark, N. Y.	Feb. 24	Eben Lake spring.	Sample of institution water.	Light greenish tint.	None	None	None
924	Dr. P. D. Carpenter, H. O., Pittsford, N. Y.	Mar. 14	Wells supplying water for Pittsford.	From Health Officer, Pittsford, N. Y.	Light greenish tint.	None	None	None
925	Dr. S. Demarest, H. O., Suffern, N. Y.	May 8	Spring		Light greenish tint.	None	None	Slight
926	Dr. J. L. Hanmer, H. O., Middletown, N. Y.	May 15	Not stated	Bennett	Light yellowish green tint.	Slight	Slight	Slight
927	Dr. E. A. Simonds, H. O., Carthage, N. Y.	May 29	Spring water, proposed supply for village.	Vrooman, sample taken 6 P. M., after a sharp shower ten hours previous.	Light greenish tint.	None	Very slight	None
928	Department of Health, New Rochelle, W. B. Craft, clerk.	June 6	Well in sandy soil 15 feet from house and 40 feet from privy.	Dept. of Health, City of New Rochelle, N. Y.	Very light greenish tint.	None	Trifling	None

RESULTS ARE PARTS IN 100,000.)

Chlorine in chlorides.	Free ammonia.	Albuminoid ammonia.	Nitrogen as nitrites.	Nitrogen as nitrates.	Total solids.	Loss on ignition.	Behavior during ignition.	Mineral matter.	Remarks.
1.40	0.0030	0.0120	0.0000	0.0588	37.20	7.40	Darkened........	29.80	Appearance fair, but water not of very satisfactory quality.
2.40	0.1350	0.0250	0.0370	0.2104	43.80	9.60	Darkened........	34.20	As in sample 917, reported upon Dec. 22, 1905, the increased amounts of chlorine, nitrogen compounds and total solids, plainly show the effect of the discharge of the effluent into the stream.
0.20	0.0025	0.0070	0.0000	0.1536	26.20	6.40	No change.......	19.80	Satisfactory quality.
0.70	0.0245	0.0090	0.0000	0.1428	34.60	9.20	Darkened very slightly.	25.40	Aside from free ammonia which is very high and which may be due to use of old medicine bottle and old cork from same, this water is of satisfactory quality.
0.50	0.0035	0.0045	0.0000	0.0632	a134.90	b27.20	No change.......	c107.40	This water is of excellent quality although total solids are so high that it is not well adapted to laundry use or use in boilers. The high solids are of little importance from sanitary point of view and the water may be used for drinking purposes with entire satisfaction.
0.90	0.0045	0.0055	0.0000	0.0224	d125.60	e20.80	Darkened slightly.	f104.80	Aside from total solids which are very high this water is of satisfactory quality, but is not well adapted to laundry use nor use in steam boilers.
0.40	0.0060	0.0070	0.0000	0.0336	13.60	3.40	Darkened very slightly.	10.20	This water is of satisfactory quality.
0.80	0.0120	0.0140	0.0000	0.0188	23.80	5.20	Darkened slightly.	18.60	This water, while not grossly contaminated, is not entirely satisfactory, and cannot be recommended for domestic use.
0.20	0.0020	0.0095	0.0000	0.0348	g14.60	3.20	Darkened very slightly.	11.40	This water has a good appearance; is free from evidences of objectionable pollution; comparatively soft; and is on the whole, of satisfactory quality.
2.60	0.0015	0.0045	0.0000	1.0520	31.80	6.40	No change.......	25.40	Not entirely satisfactory. See accompanying letter.

a Equivalent to grains per U. S. gal. 78.51. b Equivalent to grains per U. S. gal. 15.86. c Equivalent to grains per U. S. gal. 62.65. d Equivalent to grains per U. S. gal. 73.26. e Equivalent to grains per U. S. gal. 12.13. f Equivalent to grains per U. S. gal. 61.13. g Residue on evaporation colorless.

WATER EXAMINATIONS —

No.	Received From.	Date.	Source.	How labeled.	Appearance.			Odor at 100° F.
					Color.	Turbidity.	Sediment.	
		1906						
929	Department of Health, New Rochelle, W. B. Craft, clerk.	June 14	Well............	Dept of Health, New Rochelle cemetery.	Light greenish tint.	None.......	Very slight..	None.....
930	Dr. F. E. Bolt, H. O., Meredith, N. Y.	July 17	Well, 40 feet from drain; 15 feet from house, 30 feet from cistern in cellar.	Dr. F. E. Bolt..	Light greenish tint.	None.......	Very slight..	None.....
931	Dr. J. L. Hanmer, H. O., Middletown, N. Y.	July 20	Not stated.......	Crawford......	Very light greenish tint.	None.......	Trifling......	None.....
932	Dr. J. L. Hanmer, H. O., Middletown, N. Y.	Aug. 13	Not stated.......	Bennett.......	Light greenish tint.	None.......	Very slight..	None.....
933	Dr. J. L. Hanmer, H. O. Middletown, N. Y	Aug. 13	Not stated.......	Cunningham...	Light greenish tint.	None.......	Very slight..	None.....
934	Dr. J. L. Hazen, H. O., Brockport, N. Y.	Aug. 13	Well, proposed domestic supply for Brockport.	From Dr. John Livermore Hazen, Brockport, N. Y.	None.........	None.......	None.......	None.....
935	Dr. A. R. Ellis, H. O., Roxbury, N. Y.	aSept. 6	Driven well, 20 ft. deep in sandy soil, 100 ft. from cesspool.	A. R. Ellis, M. D., Roxbury, N. Y.	Very light greenish tint.	None.......	None.......	None.....
936	Dr. D. S. Macnee, H. O., Ripley, N. Y.	Sept. 13	Well, described in letter accompanying sample.	From Dr. D. S. Macnee.	Greenish tint...	None.......	Very slight..	None.....
937	Dr. E. E. Eddy, H. O., Redwood, N. Y.	Oct. 4	Well in village near house and barn.	From E. E. Eddy, M. D., H. O., Redwood, N. Y.	Light greenish tint.	None.......	Trifling......	Slight.....

a Ordered examined Sept. 11, 1906.

RESULTS ARE PARTS IN 100,000.)

hlorine in lorides.	Free ammonia.	Albuminoid ammonia.	Nitrogen as nitrites.	Nitrogen as nitrates.	Total solids.	Loss on ignition.	Behavior during ignition.	Mineral matter.	Remarks.
0.30	0.0030	0.0075	0.0000	0.0908	16.40	3.20	No change.......	13.20	This water is of fairly satisfactory quality and is, in most respects, superior to sample No. 928 examined on June 9.
0.60	0.0025	0.0035	0.0000	0.1816	8.80	2.40	No change.......	6.40	This water shows little evidence of contamination and is to be considered as of satisfactory quality.
0.30	0.0005	0.0030	0.0000	0.1108	12.80	3.20	Darkened very slightly.	9.60	This water is of good quality. No particulars concerning the sample were supplied.
0.70	0.0020	0.0030	0.0000	0.0292	27.20	4.20	No change.......	23.00	Satisfactory quality.
8.90	0.0065	0.0075	0.0000	1.6680	71.60	13.20	Darkened very slightly.	58.40	Not of satisfactory quality
0.60	0.0005	0.0015	0.0000	0.3760	29.40	5.80	Darkened very slightly.	23.60	Good quality.
0.40	0.0075	0.0045	0.0000	0.3332	a9.40	2.80	Darkened very slightly.	6.60	Results indicate that natural purifying action of soil is not exhausted and water cannot be condemned on analytical data alone but see letter accompanying this report.
1.40	0.0020	0.0040	0.0000	0.1332	16.40	3.60	Darkened slightly.	12.80	This well is not well situated, but analytical results do not indicate serious pollution and water may be regarded as of fairly satisfactory quality.
2.30	0.0015	0.0035	0.0000	0.1816	37.40	7.60	Darkened very slightly.	29.80	Appearance fairly good and odor slight; ammonias fairly low; nitrites absent and total solids not excessive; chlorine and nitrogen in nitrates rather high. Results not entirely satisfactory but water cannot be condemned as grossly polluted.

a Residue on evaporation colorless.

CANCER LABORATORY

CANCER LABORATORY

BUFFALO, N. Y., *January* 9, 1907.

DR. EUGENE H. PORTER, *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I have the honor to transmit herewith the Seventh Annual Report of the State Cancer Laboratory of the Department of Health.

As I communicated to you in the last annual report, the results of the work of the two preceding years enabled us to demonstrate that cancer is in principle a curable disease. We are now able to inform you that the work of this laboratory in that connection has been confirmed and amplified by publications during the past year, emanating from the laboratories of Professor Ehrlich, at Frankfurt, in Germany, the Royal Cancer Research Fund, of London, England, and from the Huntington Research Fund under the auspices of Cornell University, in New York.

A resumé of this work and the demonstration of the fact that this laboratory published the essential features of the recent advances in this field nearly a year in advance of all others will be found in an article by Doctor Clowes in this report. The particular advances in our own research during the past year are also set forth in this article. In the article on infected cages as the cause of cancer among small animals, we feel that the laboratory has been fortunate in obtaining evidence bearing directly on the contagiousness of cancer. The evidence in this matter I desire particularly to call to your attention, inasmuch as it bears directly upon the great economic question of the spread of cancer.

It has been customary since the foundation of the laboratory to incorporate in this portion of the report the number of deaths occurring in the current year from cancer. In reviewing the statistics from year to year it will be seen that cancer, since the foundation of this laboratory, has progressively increased. In

order to compare the relative progress of tuberculosis and cancer we have determined the average death rate per 100,000 from these diseases, in the first place, for the years 1896, 1897, and 1898, collectively, and, in the second place, for the years 1903, 1904, and 1905, collectively, from which it will be seen that whilst tuberculosis has fallen from 186 per 100,000 to 177, cancer has increased from 59 to 74 per 100,000, representing for tuberculosis a decrease of 4.9 per cent., and for cancer an increase of 25.4 per cent.

	Tuberculosis.	Cancer.	Population.
1896	13,265	3,789	6,840,000
1897	12,641	4,131	6,988,000
1898	12,979	4,385	7,110,000
Average	12,961	4,101	6,979,333
Deaths per 100,000	186	59	
1903	13,194	5,456	7,614,281
1904	14,158	5,697	7,746,000
1905	14,061	6,056	7,918,000
Average	13,805	5,736	7,759,427
Deaths per 100,000	177	74	

While it is impossible to attribute the apparent increase in cancer entirely to the spread of the disease, there being other factors which readily cause an apparent increase, it must be conceded that in the light of the evidence pointing to the contagiousness of cancer, a great factor must be the absolute neglect of all precautions to combat the contagious element. The decrease in the spread of tuberculosis is entirely due to the recognition of its contagiousness. We have to-day no specific for tuberculosis. This change is due to the segregation of patients, fumigation of surroundings, sterilization of dressings, disposal of sputum, and a general and energetic campaign of education by the medical profession. In cancer, on the other hand, we find that nothing whatsoever is practiced, that many of the profession have been extremely skeptical as to its contagiousness, although the literature of the last few years has repeatedly contained ar-

ticles showing that cancer has a tendency to occur endemically in certain localities, and that the occurrence of an unusual number of individual cases in certain houses is characteristic of the disease. How significant the evidence is, in favor of the surroundings of cancer patients becoming infected, is to be found in the ever-increasing number of publications directly bearing upon so-called "cancer-houses." It will be remembered that in the fourth annual report from this laboratory the results of a striking piece of research of a cancer district in western New York formed part of the report, and a further research in this line was incorporated in the sixth annual report of the laboratory.

During the past year a number of significant publications have appeared in the literature of cancer, and these, taken in conjunction with the striking cases of infected cages reported by others, and the remarkable occurrence which we present in this report, would indicate the desirability of the inauguration of a campaign against the spread of cancer similar to the successful propaganda against the spread of tuberculosis. I would suggest that the evidence is now sufficient for the Department of Health of the State of New York, as the result of researches conducted in this laboratory, to recommend to all health officers of the State the desirability of proper sterilization and disposal of all dressings of cancer cases, the fumigation and sterilization of rooms occupied by cancer patients. From the facts to be adduced from the infected cages under observation in this laboratory, it would appear that the contagion of cancer is extremely persistent, one cage having retained its infective characteristics for a period of not less than three years, a lapse of time equal to one-third the life of the animals which occupied the cage (white rats). For this reason, although there is little evidence that individuals associated with cancer cases are in any immediate danger of contracting the disease, it is extremely probable that the contagion of cancer can be transferred from cancer patients to their surroundings, where in course of time it assumes a form in which it is again capable of infecting susceptible individuals.

Since the inception of this laboratory the members of the staff have been greatly impressed with the possibilities of the parasitic

theory of cancer, and while we have not neglected the various other lines of research, much of our work, especially our researches on immunity, has been more or less directed by this inclination. In the third, fourth, and fifth annual reports of this laboratory evidence was produced that cancer as a disease possessed certain points of comparison with other diseases, especially the acute exanthemata, syphilis, and possibly certain skin diseases. The peculiarities of the disease also suggested to us the probability that the organism of cancer was to be found either in the animal kingdom, or in that indefinite field which marks the boundary line between the lower animal and the vegetable world. Since the appearance of these reports a protozoan organism has been discovered in syphilis, and advances have also been made in the study of the suspicious structures found in the epithelial cells in smallpox. Following this line of research we have not neglected to systematically study the rich material which the laboratory now possesses, and we are now able to report that in all of our mouse cancers there is to be found, with striking regularity, an organism of the same species as the probable organism of syphilis. There is at present no positive proof that this organism is the cause of these tumors, but the regularity of its occurrence, and other lines of reasoning which are included in the article especially dealing with this subject, show that it is not beyond the bounds of possibility that future evidence may ultimately prove its etiological significance.

The organization of the staff of the laboratory remains practically the same as in our last report. It is greatly to be regretted that although, for the present year, the Legislature acceded to our request for a larger appropriation, the late Governor found it necessary, on the basis of a technicality, to cut from the appropriation $3,000 which was greatly needed. The next two or three years are sure to prove years of great activity in cancer research, which, as you know, is being prosecuted in several laboratories in Europe, and in at least two other quarters, under special appropriations, in this country. The New York State Cancer Laboratory is the first institution of its kind to be established in any country, and it is peculiarly appropriate that the State of New York should profit by the advantages which

our early foundation has given us in this field. The amount of work which we shall be able to accomplish in the immediate future is largely dependent upon the amount of means at our disposal. Much of this present experimentation is simply a question of outlay for the necessary materials and sufficient assistance. We have now reached the point where we shall shortly desire to use larger animals than those we are employing, in order to attempt to apply the recently discovered facts to the ultimate cure of human cancer cases. As I pointed out to you in the last report, both the extensive laboratories of Professor Ehrlich and the Royal Cancer Research Fund, in London, enjoy larger resources than this laboratory, and for that reason I would ask that the item of $3,000, which was cut from the appropriation by the late Governor, be restored in the present appropriation, and that the total figure be fixed at $21,000. With this increase the scope of our work can be considerably enlarged.

In this connection I desire to call your attention to the fact that the principals in the laboratory have from the beginning served it with great devotion, on salaries which are not commensurate with their standing in the scientific world. The direction which cancer research has necessarily taken in the last two years necessitates the maintenance of a large staff of assistants, and with our present appropriation we are forced to employ a staff of thirteen individuals. The relative expenditure for stock, material, and equipment has so greatly increased by the direction which our work has necessarily taken, that the laboratory has from the first paid the lowest possible salaries to its employees. The great increase in the cost of living will make it necessary to remedy some of the greatest discrepancies in this connection during the coming year, unless the laboratory is to lose the services of some of its most important members.

The expenditures for the past year have been as follows:

September 30, 1905 —	Balance	$946 26
September 30, 1906 —	Stock and material	2,140 25
	Equipment	1,497 35
	Expense	2,151 29
	Salaries	11,012 98
	Total	$17,748 13

September 30, 1905—Appropriation, 1905–6	$15,000 00
September 30, 1906—Balance	2,748 13
Total	$17,748 13

The staff of the laboratory as at present constituted is as follows:

H. R. Gaylord .... Director
G. H. A. Clowes .... Chemist
G. N. Calkins .... Biologist
F. W. Baeslack .... Assistant in biology and histology
C. A. Maclay .... Secretary
D. R. Averill .... Assistant in photo-chemistry
F. A. Payne .... Janitor
Six assistants classed as laborers.

I take pleasure in stating to you that we feel that the promises of the previous year have been amply fulfilled, that the work is assuming an ever-increasing interest and importance, and that after many years of tedious research the efforts of those who have supported the laboratory are being rewarded.

On behalf of the staff permit me to express our appreciation of the constant sympathy and support the laboratory has enjoyed from your Department. I am,

Very respectfully yours,

HARVEY R. GAYLORD, M.D.,
Director

On the Presence of a Spirochaeta in Primary and Transplanted Carcinoma of the Breast in Mice

By Harvey R. Gaylord, M.D.

In the early spring of 1905 the writer first observed in the epithelium of a retrograding transplanted tumor of the Jensen series, certain curious structures which were the subject of a publication by G. N. Calkins and G. H. A. Clowes in No. 4, Volume II of the Journal of Infectious Disease under the title, "Some artefacts in mouse carcinoma." The material in which the structures in question were first seen was hardened in an excess of mercury and contained, besides the structures about to be specified, curious deposits in crystalline form, both intra- and extracellular. The structures which attracted our attention at that time were very fine filaments of varying length, frequently possessed of clubbed ends, located in the protoplasm. They are illustrated by figures 5 and 6 of plate 17 and by drawings by Calkins in 6, 7, 8, 9 and 10 of plate 18.

The first impression which we had of these structures was that they must be some sort of parasitic form as yet unrecognized, but our inability to distinguish them from the deposits of mercury in the surrounding tissues and in the nuclei and protoplasm of the cells of the tumor led to the conclusion by Calkins and Clowes that they were artefacts and the specimen was thereupon described and published.

So deeply impressed was the writer that certain of these forms must be parasitic, that he never abandoned that point of view and that Clowes and Calkins were also of the opinion that they repre-

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Note.— The title of this paper was on the program but it was not read, at the meeting of the British Medical Association in Toronto, August 22, 1906. The facts in substance were presented at a meeting of the Academy of Medicine in Cleveland January 11, 1907, and before the State Medical Society of New York at Albany on January 29, 1907.

sented unusual structures impregnated with mercury, is shown by the following sentence in their publication on page 559: "While these deposits are to be interpreted as artefacts, the fact must not be overlooked that something of an unusual nature is present in these cancer cells and tissues, upon which the salts of the fixing agent work in forming the deposits of various kinds."

Being deeply impressed with the possible significance of these curious filamentous structures in the vacuoles of the cells of this transplanted mouse tumor, and having made various attempts to find a method which would better demonstrate them if present, the writer at once saw, on the publication of Levaditi's article (Annales de l'Institut Pasteur, No. 1, January 25, 1906) a close resemblance between these filamentous structures and the involution forms of spirochaeta pallida so frequently encountered in syphilitic tissue. Thereupon a systematic investigation of all the transplanted mouse tumors in the State Cancer Laboratory was undertaken by the Levaditi method. It is the results of this systematic examination that are to be here reported.

An examination of transplanted tumors from three separate strains which are at present in existence in this laboratory, has shown the constant occurrence of a characteristic organism in the transplanted tumors of each. The tumors from which these strains are derived are the famous Jensen, which is now, in our hands, in its twentieth generation; a very virulent tumor known as the Brooklyn tumor, in its twentieth generation and a less virulent tumor, known as the Springfield tumor, in its twelfth generation. All three of these tumors are carcinomata of the breast. They present practically identical characteristics, being carcinoma solidum, with occasionally adenomatous types.

The tumor known as 3^{10} in which the original thread-like structures impregnated with mercury were discovered in March, 1905 belongs in the second generation of the Jensen strain. We have examined 914 E, 914 G, 915 A and 915 D out of the fourteenth generation of this tumor by the Levaditi method. All of these transplanted tumors were movable beneath the skin and uncontaminated. At the margin of the tumors in the Levaditi sections is found in the immediate neighborhood of the infiltrating edge of

epithelium a small spiral organism from 2.5 to 7.8 microns in length with from 4 to as high as 13 or 16 nodes or corkscrews. The organism is .6 of a micron average width and the impregnated spiral tapers slightly toward the ends. The ends are slightly rounded and no evidence of an undulating membrane or flagellum could be determined.

Of the Springfield tumor 900 F, 921 F, and 921 H, of the sixth generation were subjected to the Levaditi method. An organism identical in appearance was found at the margin in the same relation to the epithelium and distributed in the same manner as the organism found in the Jensen tumors.

Of the Brooklyn tumor 741 A of the ninth generation, 763 E of the eleventh generation, 918 G of the thirteenth generation, 904 K of the thirteenth generation, 935 H of the fourteenth generation, 918 C of the fourteenth generation, 1039 E of the fifteenth generation, 1088 C of the sixteenth generation, 1113 A of the seventeenth generation, were examined by the Levaditi method. In every section of every one of these tumors at the margin were found the same charactertistic spirochaetae described in the Jensen and Springfield tumors, in great numbers about the margin of the tumor in the connective tissue immediately adjacent to the epithelium. The organism is also occasionally found in the stroma or between the epithelial cells through the substance of the tumor, but their characteristic distribution is in the zone of round-celled infiltration and between the epithelial cells at the infiltrating edge of the tumor. Some of the larger of these tumors showed in their centers the usual areas of necrosis. A careful examination of these areas of necrosis failed to show the presence of any microorganisms of any kind.

Having determined the practically constant occurrence of this organism by the Levaditi method, attempts were made to stain it by Giemsa, the various flagella stains Wright's method, all without success, although the material which was used was known to contain large numbers of organisms. The organism could, however, be easily detected in fresh material. It is rather difficult to see because of its low refractive index and the high refractive index of the fluid portions of the tumor. Patient search has, however, in every instance in which fresh material has been examined,

demonstrated well-defined, actively motile organisms. Measurements made of these fresh, living organisms correspond with those made of the hardened organism in the Levaditi sections. Dr. F. G. Novy, who examined for me a fresh preparation from an uncontaminated mouse tumor, made the following measurements: From 2.5 to 7.8 microns in length and from 4 to 13 turns.

The proper position of this organism and a more definite description of its characteristics has been kindly undertaken by Professor Calkins.

Having determined the constant occurrence of a living spirochaeta in all of our transplanted mouse tumors, it was of the greatest importance to determine with what frequency they could be found in unattached uncontaminated primary mouse carcinomata. We have up to the present time examined ten primary mouse carcinomata. One of these was badly impregnated, so that it was impossible to determine the structure of the tumor satisfactorily and must be excluded. Of the remaining nine, the organisms have been found in all. They were found with no difficulty whatsoever in five. These are known as G-7, G-E, G-A, G-C., Springfield No. 8 and Buffalo I. In the tumors known as G-10 and G-8 the impregnation was imperfect and the organisms were of a pale brown, but could, however, be definitely distinguished. Tumor G-D was a large tumor and on its superior aspect slightly attached to the skin. The greater part of the central portion of the tumor was necrotic; only a very narrow margin at the periphery of the deeper portions of the tumor was in a state of active growth, and in these regions the organisms, although few in number, could be easily found.

It is to be noted that all of these tumors, with the exception of G-D and Buffalo I, were freely movable beneath the skin and small. All the G tumors were obtained at different times from a dealer in Massachusetts, whose animals are frequently affected with carcinoma of the breast. We have received from this dealer in the course of the last eight months thirty-one tumors. The tumor designated Springfield 8 was a small primary tumor obtained from a dealer in Springfield, Ohio, who has furnished us with three tumors in the last year and a half. It is from this dealer that we have obtained a cage from which, in the course of

three years, have been taken over sixty mice with carcinoma of the breast. The cage, with its contents, was brought to Buffalo and since its arrival at this laboratory five mice with cancer of the breast have been removed from it. Both of these series of tumor mice have been reported upon in the Journal of the American Medical Association January 15, 1907. The Buffalo I tumor was found in a cage of pet mice in the house of a Buffalo physician.

For control of the work up to this point we have impregnated and sectioned pieces from all the organs and subcutaneous tissues from five supposedly normal mice. A prolonged search of all of these tissues has given negative results.

Before passing to a study of the relation of these organisms to the structure of the tumors in which they occur, a review of the scanty literature on the presence of spirochaetae in mouse and other carcinomata is in order.

The first reference to the presence of spirochaetae in malignant tumors is found in the report of Hoffman in the Berl. klin. Wochenschrift No. 28,-1905, page 880. Under Hoffman's direction Mulzer found spirochaetae in the scrapings from a case of carcinoma of the cervix and in two squamous epitheliomata, one from the face and the other from the abdominal aspect. All of these tumors were *advanced and ulcerated.* In all three cases the spirochaetae showed coarse gyrations and stained more deeply than spirochaeta pallida. Certain individuals were encountered, however, which did not stain so deeply and in the size and number of their gyrations closely approximated the latter organism.

Loewenthal also describes the detection of spirochaetae by the Giemsa method on the surface of ulcerated tumors. (Berl. klin. Wochenschr. No. 10, 1906.) He calls attention to the fact that they are not only present in human tumors under such conditions, but he has found them in numbers associated with the usual bacteria on the ulcerated surface of a tumor in the neck of a dog. He calls attention to the similarity of the organism he observed to a small spirochaeta found in the faeces. This organism stains usually a pale blue with Giemsa and stains also with a borax-methylene blue solution, which does not stain the spirochaeta pallida. The organisms are from 2½ to 6 microns in length.

He could not determine their thickness but estimated it to be from ¼ to ½ a micron. They appear, however, plumper when stained with Loeffler's flagella stain. The gyrations are very close together and abrupt. The organism has usually from four to twelve corkscrews and he estimates these to be about half a micron apart. He proposes the name for this organism "spirochaeta micro-gyrata." Up to the present he has been unable to determine the presence of flagella and an undulating membrane was not visible, but he inferred from the increased plumpness of the organism when stained with Loeffler's flagella stain that one was probably present. The long examples of the organism were frequently found to consist of two attached at the ends. This organism he considers may be readily differentiated from spirochaeta pallida. Besides this organism he frequently found a larger organism from 5 to 11 microns in length and corkscrews from 1.5 to 2 microns apart. This organism stains blue with Giemsa. In all cases where Loewenthal detected the spirochaetae on the ulcerated surface of tumors he found regularly, rod-like, straight or slightly bent, sausage-like structures which, in their appearance and form, closely resembled the so-called fusiform bacillus which accompanies the spirochaetae so frequently found in the buccal cavity, which are known as spirillum sputigenum. Several authors have already advanced the view that there is a genetic relation between these fusiform structures and the spirochaetae with which they are associated. Loewenthal advocates the same view in connection with the fusiform structures accompanying the small spirochaeta found on the surface of ulcerating tumors, for the reason that they invariably accompany these organisms. He states that wherever he found fusiform structures in a smear, on further search he never failed to find the small spirochaeta in question.

Borrel found helminthia in two enclosed mouse tumors, surrounded by large numbers of leucocytes and endothelial phagocytes. The worms were transported to the tumors through the blood vessels after penetrating the intestinal wall. In the neighborhood of these worms Borrel states that large numbers of spirochaetae were present, and in every cachectic mouse sent from Ehrlich's laboratory, in which the tumor was not ulcerated, he found large numbers of spirochaetae. These had coarse gyrations. In the

two cases described in Paris, the spirochaetae were of different form, very small, and with closely packed spirals. The tumors thus examined were movable beneath the skin, were not ulcerated, and at the time of publication were still living. He concluded that it was impossible to draw etiological conclusions from these observations, but he found it of great interest that spirochaetae and worms were found in these particular strains.

Spirochaetae in unulcerated human cancer, demonstrated by the silver method, have as yet been reported by but one observer, Friedenthal (Berl. klin. Wochenschr. No. 37, September, 1906). Friedenthal is of the opinion that the structures, which are clearly spirochaetae, from his illustrations, are not organisms, but represent condensations of the protoplasm impregnated with silver. He obviously published his observations to show that so-called spirochaetae of syphilis, which Schulze and others hold to be nerve fibres and elastic fibres impregnated by the silver method, are not necessarily all attributable to this misinterpretation. Inasmuch as the structures he described were within the epithelial cells of the tumor, Friedenthal held that some of them were condensations of the protoplasm, etc., and not nerve endings or elastic fibres.

It will be seen that of these observers Mulzer describes a coarse spirochaeta on the ulcerated surface of human tumors, Loewenthal describes a coarse and a smaller organism known as the spirochaeta micro-gyrata on the surface of ulcerated human and in a tumor in the neck of a dog. None of these authors attribute any significance to the presence of these organisms, as they were found under conditions which would not justify any suggestion that they were other than accidental in their occurrence. Borrel found in two cases a small spirochaeta in connection with helminthia and an organism with coarse gyrations in a cachectic mouse tumor sent from Ehrlich's laboratory. Borrel does not state whether these tumors were primary or transplanted tumors, but the inference is that they were transplanted. He believed that the organisms were conveyed to the tumors by the helminthia in the first two and drew no conclusions as to their possible etiological significance in any of the three cases described.

Other than spirochaetae associated with mouse tumors Wenyon

(Journal of Hygiene, October, 1906) describes a spirochaeta which he found in the blood of a gray mouse in the Pasteur Institute. From this mouse he succeeded in infecting other mice, and in the succeeding mice both the blood and the spleen contained the organism and could be used for further inoculation. He inoculated as many as fifty mice and never encountered a case of natural immunity. The organisms stained readily with any of the ordinary stains, Giemsa, Fuchsin, methylene blue, etc.

"In stained preparations the spirochaeta is seen as a uniformly staining spiral the longer forms, however, show a clear unstained central spot (see Diagram Nos. 8 and 9). The ends are slightly tapering; there is no sign of a nucleus or undulating membrane. As just mentioned, the larger forms have a clear spot at their center, and in some of these the body of the spiral tapers towards this spot. In some cases two small spirals are attached end to end by an unstained region. These forms are evidently stages of transverse division. No indications of longitudinal division were seen nor any mode of reproduction other than the one just mentioned.

"The number of the turns of the spiral varies from six in the longest forms to two in the shortest. The length of the spirochaetae varies from six to seven microns to three or four microns. The width is about two microns.

"The spirochaeta was always seen in the spiral form; no other forms were found at any time."

Wenyon states that after discussing the matter with M. Borrel they arrived at the conclusion that the organism just described and the one observed by Borrel in the juice of malignant growths of mice, described by him (Comptes rendus Soc. Biol., 1905, p. 770), are the same organism and comparison of Borrel's preparations and those of Wenyon lead to the same conclusion. Wenyon attempted to test the theory of Borrel, that these organisms had migrated into the tumors from the intestinal tract, inoculating mice with mucus from the intestinal tract of mice which contained large numbers of varying kinds of spirochaetae. These conclusions were negative; no infection or abscess resulted. The mucus from the intestinal tract of a mouse infected with spirochaeta m. likewise gave negative results. Wenyon concludes that

there is no evidence that these spirochaetae have originated in the intestine.

The description given by Wenyon of the organism found in the blood of otherwise normal mice clearly distinguishes it from the organism which we have described. If it is identical with the organism found by Borrel in his mouse tumors, that would seem to distinguish his organism from the organism which we have found. Borrel does not give the method by which he succeeded in demonstrating the organism found in his mouse tumors, but as his publication antedates that of Levaditi, it is highly probable that it was by means of the Giemsa or some aniline straining method. Whether our inability to stain our organism with any of the aniline methods will prove a means of distinguishing it from other small organisms, such as that of Lilienthal and the smaller organisms found by Borrel, in combination with helminthia, remains to be seen, but the organisms with the coarser gyrations appear to be clearly distinguishable from our organism.

The distribution of the organisms through the primary tumors examined is of great importance. A careful study of these tumors will appear to throw some light on whether or not the organisms were accidental in their relation to the tumors in which they are found, or whether they may bear some etiological relation. A description of one of these tumors will suffice for all, the only difference being in the number of organisms which the small fragments impregnated with silver happen to contain. The greatest number were found in the primary tumor known as G-7, and with the qualification that the other tumors contain fewer organisms, the description of this tumor will apply to the remaining seven.

This tumor was sent from Massachusetts and remained in the laboratory about two days. The tumor was about the size of a small bean, measuring approximately 1 cm. by .6 cm. in its greatest diameter. It was slightly flattened, freely movable beneath the skin and was situated on the ventral aspect. The mouse was killed and the tumor removed September 20, 1906. Weight of mouse 33.5 grams, weight of tumor 1.5 grams. Six mice, Lot 1031, were inoculated with portions of the tumor. Results to date, negative. Small fragments of the tumor were hardened in formalin and some of them impregnated by the Levaditi method.

An examination of a section of the tumor hardened in formalin and stained with Borrel's method, with low power, shows the tumor to be a rapidly growing adeno-carcinoma of the breast. In many portions the tumor assumes the characteristics of a rapidly growing carcinoma solidum. At the edge of the tumor is the usual characteristic proliferation of the connective tissue invaded by prolongations and nests of epithelium from the tumor mass. In some portions of the periphery a more or less definite connective tissue capsule is present. Scattered through the tumor are the small areas of necrosis which characterize rapidly growing tumors of this type. The stroma is in some portions of the tumor poorly developed, in others well-defined. Here and there, especially at the margins where the tumor is penetrating into the connective tissue structure, the tendency to the adenomatous type is quite marked. In these regions cysts of considerable size can be found, filled with the usual coagulated fluid mixed with cell detritus. A careful examination of such a section with oil immersion fails to show the presence of any organisms, even after comparison with sections from the immediate neighborhood impregnated with the Levaditi method, in which plentiful spirochaetae are present. Not even unstained structures which one might identify can be determined.

Sections from small pieces of the tumor impregnated by the Levaditi method, examined under high power, present a very striking appearance. First of all, lying free within the cysts in the coagulated contents are found sharply defined, intensely black spirals measuring from 2.5 to 7.8 microns in length. The corkscrews are from three or four to thirteen or even more in number. These organisms are more or less regularly distributed through the cyst spaces (see Fig. 4, Plate I), and present so characteristic an appearance that they can, to our mind, never be confused with nerve endings. In the rapidly growing portions of the tumor, between the epithelial cells, one frequently encounters aggregations of five or six or even a dozen of these characteristic organisms lying in small, clear spaces between the epithelial cells, as though they were surrounded by some clear fluid producing a form of vacuole. Fig. 6, Plate I.

Passing to the margins of the tumor one finds that in the nests of epithelium penetrating into the connective tissue stroma the

lumena of the small tubular structures frequently contain aggregation of organisms and here and there free epithelial cells with organisms in their protoplasm. One can easily imagine that the development of the larger cysts in the tumor might be determined by the proliferation of the epithelium around the small groups of organisms thus found. Beginning with a secretion of fluid around the organisms, as shown in Fig. 6, Plate 1, the proliferation of the epithelium might produce the beginning of a cyst, such as is represented by Figs. 8 and 3, and the continued secretion of fluid and associated proliferation might ultimately terminate in the development of a larger cyst, such as Fig. 4. The invariable presence of organisms in the larger cyst cavities would suggest such a possibility. The organisms are distributed in this tumor in such a way that the largest numbers of organisms are in the most rapidly growing portions of the periphery. Occasional organisms are found in the connective tissue beyond the growing edge of the tumor. This is especially well seen where the epithelium is penetrating into the adjacent fat tissue. Here organisms will be found between the fat cells a short distance in advance of the epithelium, but when one investigates the surrounding normal tissues beyond this zone there are no organisms to be found. Where the stroma of the tumor is best developed one frequently finds organisms in the stroma. Where this is not so well defined they lie between the epithelial cells, as shown in Figs. 3, 6 and 8, Plate 1. Occasionally organisms can be found within the epithelial cells. Here they are frequently curved into ring forms (Fig. 7, Plate 1) or in aggregations suggesting agglutination (Fig. 7, Plate 1). The characteristic spiral form of the organism is not always apparent. Occasional forms will be met where the silver appears to have impregnated the organism homogeneously. This is usually the case with organisms within the protoplasm of epithelial cells (Figs. 7 and 8, Plate 1), and in these cases the organism frequently presents a beaded appearance suggestive of involution forms or degeneration approaching disintegration. In regions where phagocytosis is active one will find fragments of the organisms in the protoplasm of the epithelium, the organisms in these cases appearing to break up into minute granules or short S-shaped structures similar to the changes in spirochaeta obermeierei in the mononuclear macrophages in

the peritoneal cavities of hyper-immunized rats. (Pfeiffer's Phenomenon.)

The examination of sections of the remaining eight carcinomata of the breast in mice differ in no way from the findings in G-7. In the tumors in which there are few organisms these are found exclusively at the very margin of the growing edge, in the center of cell nests and in the connective tissue stroma surrounding the tumor.

In the transplanted tumors the distribution is even more pronouncedly at the margin of the tumors. In rapidly growing, early transplants, the organisms are massed in the zone of connective tissue proliferation at the margin, and in the more virulent tumors, such as the Brooklyn tumor, the organisms are frequently present in great numbers (Fig. 5, Plate I). Involution forms and disintegrating organisms are very frequent in these areas. Phagocytosis does not seem to be so active in these tumors. Careful examination of these sections from the Springfield, Jensen and Brooklyn strains show no differences in appearance or measurements, distribution or characteristics of the organisms in the different strains. We appear here to be dealing with a definite organism. In large, late transplanted tumors, in which there are areas of extensive necrosis, the organisms are exclusively confined to the growing margins of the tumor. When, as occasionally happens, the necrosis extends to the periphery of the tumor, the adjacent connective tissue zone contains either no organisms or occasionally disintegrating or involution forms. In two large tumors examined, which were badly contaminated with bacteria, no spirochaetae whatever could be found.

With the determination of the practically constant association of this characteristic organism in primary and transplanted mouse tumors, naturally arises the question as to their significance. Although it will require a prolonged and careful search through other types of tumors, especially in other animals and in human beings, before even the relative relation of this organism to the tumors in question can be definitely ascertained, still it would seem, in the light of the striking evidence of cage infection in this very group of tumors, not improper to discuss the possible etiological significance of these organisms. Up to the present time

those who have sought for parasites in cancer have searched for an intra-cellular organism and at first glance it would seem difficult to understand how an organism with the distribution of the one in question could be responsible for the epithelial proliferation necessary for the production of a malignant growth. We have for some time assumed that extra-cellular organisms might be the cause of the proliferation of epithelium through the medium of some toxic substance which they elaborate. Evidence of the existence of some bio-chemical substance of this sort in tumors has come to us in the course of our experimentation. The interesting work of Clowes and Baeslack from this laboratory on "The influence exerted on the virulence of carcinoma in mice by subjecting the tumor materials to incubation previous to inoculation," is a case in point, Clowes having reasoned that the best explanation of the marked increase in virulence produced by a short period of incubation resulted from the effect of increased temperature upon the rate of reaction of some stimulating substance contained in the tumors. These interesting observations have had a very positive and new light shed upon them by the work of Bernhard Fischer ("Die experimentelle Erzeugung atypischer Epithelwucherungen und die Entstehung bösartiger Geschwülste," Münch. Med. Wochenschr. No. 52, 1906). Fischer has made the discovery that there are certain chemical substances (thus far the fat stains, scarlet R, Sudan III and indophenol) which possess a positive chemotactic quality for the epithelium of the skin in rabbits and possibly some other animals. This chemotactic or attractive quality is only exerted when these fat stains, dissolved in olive oil, are injected into the subcutaneous tissue beneath the skin. Here they set up a chronic connective tissue proliferation similar to that found about the margins of beginning epitheliomata of the skin. The scarlet R oil penetrates into all the lymph spaces and crevices of the tissue and with the advent of the chronic connective tissue proliferation exerts a chemotactic attraction for the epithelium of the deeper layers of the adjacent skin. Oil alone does not exert an activity to this extent and it is Fischer's opinion that part of the scarlet R, although but slightly soluble in water, is taken up by the lymph and transported to the epithelium which it stimulates to proliferation. Within a short period (three weeks) the

presence of the scarlet R in the subcutaneous tissue produces an active proliferation of the epithelium of the skin, of the hair follicles and sebaceous glands, associated with the presence of typical and atypical karyokinetic figures. The epithelium penetrates into the surrounding connective tissue in the form of characteristic prolongations and nests, such as characterize the beginning of squamous epithelioma of the skin. Typical epithelial pearls are formed and Fischer states that at this stage of the process the histological appearance is indistinguishable from epithelioma of the skin. The illustrations which he gives confirm this opinion. That it is the scarlet R which attracts the epithelium is shown by the epithelium growing down to, surrounding and gradually removing the saturated oil drops. Where the scarlet oil penetrates into the lymph spaces the epithelium proliferates in the lymph spaces in pursuit of it and in one case where Fischer wounded the cartilage with the needle used for injection, he found the epithelium penetrating into the lymph spaces of the cartilage and the clefts which contained the scarlet oil. That part of the coloring matter is diffused through the tissues and that it is in this way that scarlet R produces its first effect upon the more or less distant epithelium, is shown by the occasional extensive staining of the fat constituents of the adjacent cartilage cells where the scarlet R has been injected into the connective tissue in the immediate neighborhood. Fischer found that scarlet R affects only the epithelium of the epidermis of the rabbit. Attempts to produce similar proliferations by injecting the stain into the breast, under the epithelium of the stomach and intestinal tract, have proven invariably negative. In one case a dog in which a large amount of scarlet R was injected beneath the skin and produced the characteristic proliferation of the epithelium, small nodules apparently derived from proliferation of the alveolar epithelium of the lung were found, and Fischer suggests that possibly this type of epithelium may prove less specific than others and also react to the stimulus of scarlet R.

From his experiments it would appear that scarlet R is capable of affecting only one kind of epithelium, the epidermis. Upon the cells of this structure it exerts, from its position in the subcutaneous tissue, an attractive or chemotactic function which causes the epithelium to proliferate in the deeper structures producing in

the height of its activity a picture indistinguishable from beginning carcinoma. Here, however, the analogy ceases for when the scarlet R is entirely absorbed by the epithelium, the cells rapidly hornify and the entire process subsides. Fischer points out that all that is needed to extend this process into carcinoma, would be the local, continuous production of some chemical substance similar in its affinities and charactertistics to scarlet R. In a footnote he states that he appreciates that the advocates of the parasitic theory can utilize his observations in support of some parasite working through the medium of an attraxine, as he calls these substances; in which case it would be necessary, however, to assume a special organism for every type of epithelium subject to cancerous transformation.

The distribution of the organism which we have described corresponds in very striking degree to the distribution of the scarlet R in Fischer's experiments. The absorption and removal of the scarlet oil by the epithelium finds its counterpart in the evidences of phagocytosis which we have noted. If the spiral organisms found in our tumors are the cause of these tumors, then they produce the proliferation of the epithelium through the medium of some toxic substance which they elaborate. That such a toxic substance possibly exists has, as we have pointed out, already been shown by Clowes. To our mind, the necessity of assuming a different organism for each type of epithelium rather simplifies than complicates the problem and it is not impossible that organisms belonging in the same class, or of widely different characteristics, may possess the power of elaborating specific toxic substances. A striking possibility in this connection is the so-called Bilharzia disease, in which typical cancer of the bladder is associated with the presence of the embryos of the worm in the bladder wall. It is also of interest that in Bilharzia disease no metastases have ever been found, although the local disease of the bladder presents the characteristics of infiltrating carcinoma.

The evidences of immunity associated with these tumors is, to our minds, likewise suggestive of a possible etiological significance of these organisms and in this connection, the conditions found in the tumor 3^{10} referred to at the beginning of this article are of great interest. This tumor at the time of its removal and harden-

ing had begun to retrograde and presented the histological characteristics of spontaneously retrograding tumors. It is possible that this tumor was hardened at the moment when a very active phagocytosis on the part of the remaining epithelium was in progress. As shown in Fig. 1, Plate I of this article and Figs. 5 and 6, Plate XVII of Calkins and Clowes' article in the Journal of Infectious Diseases, many of the epithelial cells of this tumor contained large numbers of small, rod-like structures which, in the writer's opinion, are the organisms we have described, incrusted with mercury. If one studies the vacuoles containing these structures in sections of this tumor, one can trace through the smaller vacuoles a gradual disintegration and final disappearance of these structures within the vacuoles. The whole presents a picture which strongly suggests the description given by Novy of the disintegration of spirillum obermeierei in the bodies of phagocytes after the injection of blood containing large numbers of this organism into the peritoneal cavity of recovered rats. As the entire process in the case of spirillum obermeierei occurred in a period of less than ten minutes, it would appear that if the appearance found in this tumor illustrated such a phenomenon in the mouse tumors, the tumor was placed in the hardening agent at the psychological moment. It will, however, require further experimentation to confirm the significance of these appearances.

It is obviously too early to draw far-reaching conclusions from the presence of this organism in our mouse tumors. First of all, more extensive experiments must be carried out. These are in progress and the organism is being studied in all its relations to the tumor in question, in which investigations Drs. Calkins and Clowes have joined. The description of what appear to be similar organisms impregnated with silver in a case of uncontaminated human cancer of the breast by Friedenthal naturally suggests that a further search for these organisms in human tumors may lead to positive results in this connection, and such a systematic search has already been inaugurated. At present it appears to us that the constancy with which this organism is found in the primary and transplanted mouse tumors is very striking, that in the light of Fischer's work it would appear to us quite possible that an extra-cellular organism distributed as this organism is distributed

could be the cause of the proliferation; that the evidence of phagocytosis and the detection of these organisms at times within the protoplasm of epithelial cells would sufficiently explain the establishment of metastases by the transportation of infected cells. The organism will have to be found with continued regularity, in which case it would appear to bear the same relation to these tumors as does spirochaeta pallida to syphilis.

Summary

1. In 1905 there were found in vacuoles in the epithelial cells of a retrograding mouse tumor, fine, rod-like structures impregnated with mercury. These the writer held to be parasites.

2. Attempts to fix these structures with other methods were not successful until the advent of Levaditi's method. With this method a characteristic spiral organism 2.5 to 7.8 microns in length and .6 microns in width with 4 to 13 turns per individual, has been demonstrated in nine consecutive spontaneous carcinomata of the breast in mice obtained from Massachusetts, Ohio and New York. In one other tumor the hardening method was a failure.

3. An examination of sixteen transplanted mouse tumors from three different sources shows the presence of the same organism in all the tumors examined.

4. An examination of fresh materials from all transplanted uncontaminated tumors from these strains, demonstrates the organism in the living state. It is frequently motile and is found with difficulty.

5. Measurements made on the fresh organism correspond closely with the measurements made in the stained preparations.

6. The distribution of the organism through the primary tumors shows that they are most prevalent in the most actively growing portions of the tumor; that they live in the connective tissue at the margin of the tumors and in the stroma of the tumor; that they are found between the epithelial cells of the tumor and in the cyst cavities of the tumors where these are present.

7. In the early transplanted tumors the organisms are found in the connective tissue zone at the growing edge and between the cells at the growing edge.

8. The more virulent tumors contain the greatest number of organisms.

9. In both primary and transplanted mouse tumors evidences of phagocytosis on the part of the epithelial cells are to be found. The organism in these cells frequently assumes the form of rings and breaks down into small S-shaped segments and granules.

10. In two tumors badly contaminated by bacteria no spirochaetae could be found.

11. The examination of organs and subcutaneous tissues of five normal mice by the Levaditi method has shown no spirochaetae.

12. All attempts to stain the organism with aniline stains to date have proven unsuccessful.

13. The organism is morphologically distinguished from the organism described by Wenyon in the blood of mice.

14. It would appear to be distinguishable from the spirochaeta microgyrata of Loewenthal and the organisms found by Borrel in mouse tumors, both of which are stained with the Giemsa stain, by its inability to take this stain.

15. In the light of authentic cases of cage infection among these mouse tumors, and with the evidence of immunity already furnished, it is proper to consider the etiological relation of this organism to these tumors.

16. In the light of Bernhard Fischer's work with scarlet R, it is clear that an extra-cellular organism distributed as this organism is distributed, working upon the epithelium by the elaboration of a stimulating substance similar to his attraxines, could cause the proliferation of the epithelium.

17. In this case the formation of metastases could result from the transportation of epithelial cells containing viable organisms.

PLATE 1.

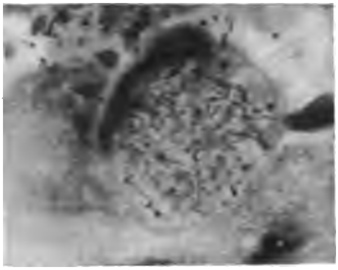

FIG. 1.

FIG. 2.

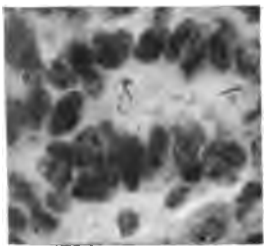

FIG. 3.

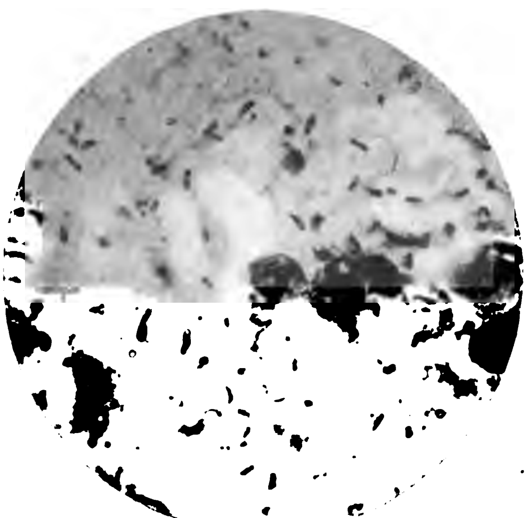

FIG. 5.

FIG. 4.

FIG. 6.

FIG. 7.

FIG. 8.

DESCRIPTION OF PLATE

Fig. 1. Epithelial cell with large vacuole in protoplasm. Nucleus pushed to one side. Vacuole filled with fine rod-like bodies some of which show gyrations and bead-like structure. Taken from Jensen mouse tumor 1905. Sublimate fixation. Organism unstained. Magnification 1030.

Fig. 2. Spirochaetae from margin of transplanted Springfield tumor. Carcinoma solidum of the breast. Levaditi silver method. Magnification 1360.

Fig. 3. Spirochaetae between the epithelial cells of primary adenocarcinoma of the breast in mouse G-7. Magnification 1030.

Fig. 4. Section through cyst in carcinoma of the breast, mouse G-7, showing three spirochaetae in cyst contents. Magnification 1030.

Fig. 5. Large numbers of spirochaetae in margin of rapidly growing transplanted carcinoma of the breast, Brooklyn tumor. Magnification 1030.

Fig. 6. Group of organisms between the epithelial cells of primary carcinoma, mouse G-7. Magnification 1030.

Fig. 7. Spirochaetae in protoplasm of epithelial cell, same tumor as 3, 4 and 6, showing phagocytic action of epithelium. Spirochaetae in form of a ring and agglutinated organisms. Magnification 1030.

Fig. 8. Spirochaetae in protoplasm of epithelial cell at the center of nest of growing epithelium. Magnification 1030.

In figures 1, 3, 4, 5, 7 and 8 the spirals are not easily seen, owing to the low magnification which was chosen to show the relation of the organisms to the tissue. In figures 2 and 6 the spirals are perfectly distinct. In every case, however, except in 7 and 8 the spirals are plainly discernable through the microscope. In 7 and 8, representing degeneration forms, the spirals are not intact.

Evidence that Infected Cages are the Source of Spontaneous Cancer Developing Among Small Caged Animals.*

HARVEY R. GAYLORD, M.D., and G. H. A. CLOWES, Ph.D.

The employment of small animals suffering from cancer for purposes of laboratory experimentation has brought to light the fact that the endemic occurrence of cancer in animals is a not uncommon phenomenon. The classical case of carcinoma in rats reported by Hanau[1] and the more recent observation of endemic occurrence of carcinoma of the breast in mice by Borrel[2] are well known. Michaelis[3] has likewise recently reported the finding in the course of one year in a single cage of five cases of carcinoma in the mouse. Loeb[4] refers to an article by Cooper, in the *Veterinarian,* on the endemic occurrence of cancer of the parotid and submaxillary glands in the cow, and has himself reported the endemic occurrence of epithelioma of the inner angle of the eye in cattle observed in the Chicago stockyards.

The endemic occurrence of malignant tumors in animals, especially laboratory animals which are confined in cages, and whose diet is controlled, and which are under much closer supervision than even the animals of the field, renders observations in regard to the infectiousness of cancer among these animals of much greater significance than many of the similar observations applying to cancer houses and the endemic occurrence of cancer among human beings.

In the light of these interesting observations, the recently reported discovery of the endemic occurrence of cancer of the thyroid in the brook trout hatcheries in Germany by Pick[5] is of the greatest significance. Pick finds that cancer of the thyroid in the various

* Reprinted from The Journal of the American Medical Association, January 5, 1907, vol. xlviii, pp. 15–21.

1 Fortschr. d. Med., 1889, vii.

2 Ann. de l'Inst. Pasteur, 1903, xvii.

3 Ztschr. f. Krebsforschung, 1906, iv, No. 1.

4 Centrbl. f. Bakt., 1904, xxxvii.

5 Vortrag gehalten i. d. Berl. med. Gesell., 1905, October.

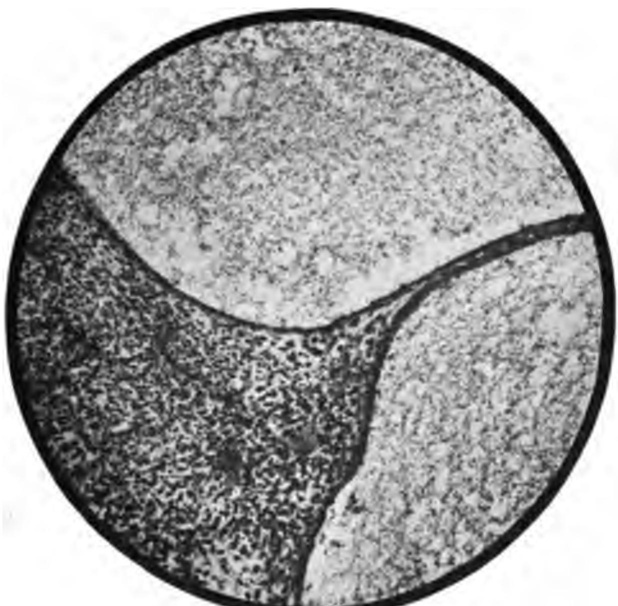

Fig. 1. Microphotograph. × 81.6 (Low power.) Original slide of Dr. Loeb showing character of primary sarcoma of the thyroid in the second Chicago rat. This slide is made from a recurrent mass which developed on the site of the primary tumor. To the left sarcoma tissue which extends into and subdivides a large cyst containing coagulated serum.

Fig. 2. × 81.6. (Low power.) Transplantation tumor (Dr. Loeb) after 19 days from primary tumor shown in Fig. 1, showing tendency to cyst formation.

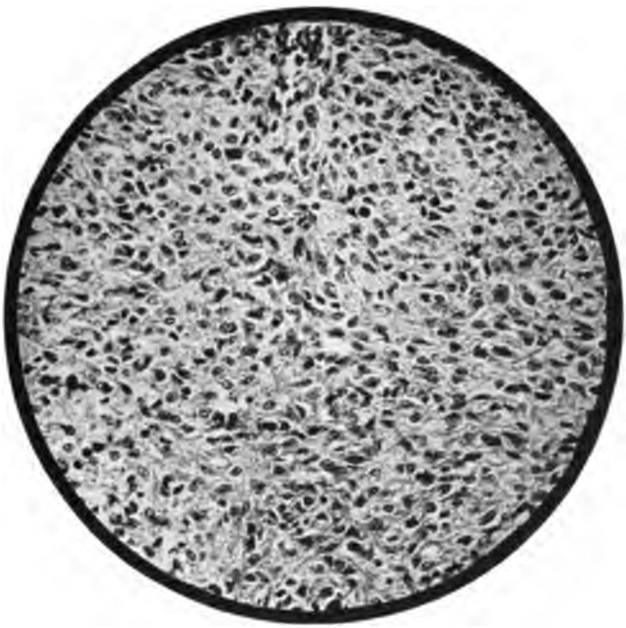

Fig. 3. × 280. (High power.) From section of tumor transplanted from the same source by Dr. Loeb while in Buffalo. This indicates the characteristics of the tumors developing in the rats which occupied the cages during the period of Dr. Loeb's stay at the New York State Cancer Laboratory.

Through the kindness of Dr. Loeb we are able to present three microphotographs. Figures 1, 2 and 3, taken from the second primary cystic sarcoma of the thyroid found in Chicago, from the small intraperitoneal transplanted nodule made by him before coming to Buffalo and a high power microphotograph of a transplanted tumor made in Buffalo from the same source. These when compared with Figures 4, 5 and 6 from similar primary and transplanted tumors from our own Rat B clearly show the striking similarity of these tumors, both primary and transplanted.

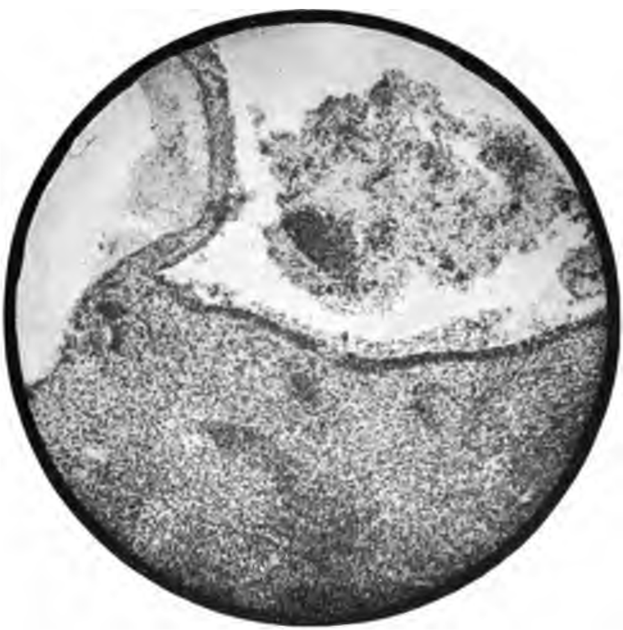

Fig. 4. × 81.6. (Low power.) Section of primary sarcoma of the thyroid in Buffalo Rat 3, showing the sarcoma tissue below extending upward and subdividing large cyst containing disintegrating sarcoma cells and serum ; to be compared with microphotograph. Fig. 1, from Dr. Loeb's primary tumor.

varieties of trout occurs in certain hatcheries in a percentage varying from two to seven, and he refers to an epidemic of this affection reported by Bonnet[6] which occurred in the fish hatchery at Torbole on the Gardesee, which, between the middle of February and the end of June, destroyed no less than 3,000 fish. Pick's investigations show that certain hatcheries are entirely free from this affection; that when the fish are affected the disease is confined to individual tanks or pools in which the fish are kept; that wild fish introduced into these ponds for the purpose of replenishing the stock acquire the disease, which observation, to his mind, obviates the necessity of considering heredity an important factor in the development of the infection. His observations establish beyond doubt the nature of the affection, which is true carcinoma, and he concludes that the endemic occurrence of cancer among trout only in certain tanks of hatcheries indicates that the water of these tanks contains the agent which is the cause of the disease. This occurrence he compares with the drinking water origin of struma as it exists in Switzerland, and concludes that the agent, whether chemical, bacterial or protozoon, must be present in the water in which these fish have been kept. During the past two years cases of endemic occurrence of tumors in small animals confined in cages have come under our observation which strongly indicate that cages under given conditions can become infected.

In the case of the sarcoma rats about to be reported, the manner in which the cage became infected would appear to be fairly obvious. The facts pertaining to this observation are as follows:

In 1904, Loeb[4] described the endemic occurrence of primary cystic sarcoma of the thyroid in rats confined in a group of cages in the laboratory of the Chicago Policlinic. The rats in question were found in three or four closely arranged cages which were used to confine a number of rats which were presumably the offspring of a few males and females which had originally been brought into the laboratory. The rats were changed about from cage to cage during the period referred to. In January, 1900, a case of cystic sarcoma of the thyroid was found in these cages. This tumor was transplantable. In August, 1901, a second rat with cystic sar-

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[6] Bayerische Fischereiztg, München, 1883, No. 6, p. 79, *et seq.*

coma of the thyroid was found in these cages. This was also transplantable. In the autumn of 1903, a third case of cystic sarcoma of the thyroid was found in these cages and this, in the hands of Dr. Herzog, who reported the fact, did not yield results on transplantation.

The structure of these tumors showed but slight differences. Loeb called attention to the fact that the great similarity of the tumors and the fact that they occurred in a relatively small number of rats which had all, at one time or another, occupied the same cage, indicated that the tumors must owe their origin to a common source. Inasmuch as the rats were all descendants of common ancestors, he was unable to exclude the possibility of the endemic occurrence of these tumors being due to heredity, but felt that the observation just as strongly indicated the possibility of a common source of infection in the cages.

These three cystic sarcomas of the thyroid proved on microscopic examination to possess practically identical histological characteristics. These characteristics in the first and second tumor persisted on transplantation. The clinical course of the disease in inoculated rats was the same. They grew rapidly on inoculation and in the later stages developed cysts of considerable size which contained a straw-colored serum which coagulated on exposure to the air. Areas of necrosis were not infrequent in both primary and transplanted tumors. Loeb demonstrated that the inoculated tumors were derived from implanted cells and that the tumor was a true sarcoma and not an infectious granuloma, in the sense which Bashford[7] has recently employed in attempting to show that the round-celled sarcoma of Sticker[8] was not a true tumor.[9] Dr. Loeb demonstrated sections of both the primary tumors and the inoculation tumors on various occasions before scientific societies, and the universal opinion of all pathologists has been that they were true spindle-celled sarcoma.

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7 Scientific Reports on the Investigations of the Imperial Cancer Research Fund, 1905, part 2.

8 Ztschr. f. Krebsforschung, 1904, i, No. 5.

9 In this connection it may be stated that Ewing and Beebe have recently investigated a similar round-celled sarcoma in the dog to that of Sticker and have arrived at the conclusion that Bashford's interpretation is not correct and that both of these tumors are round-celled sarcomas.

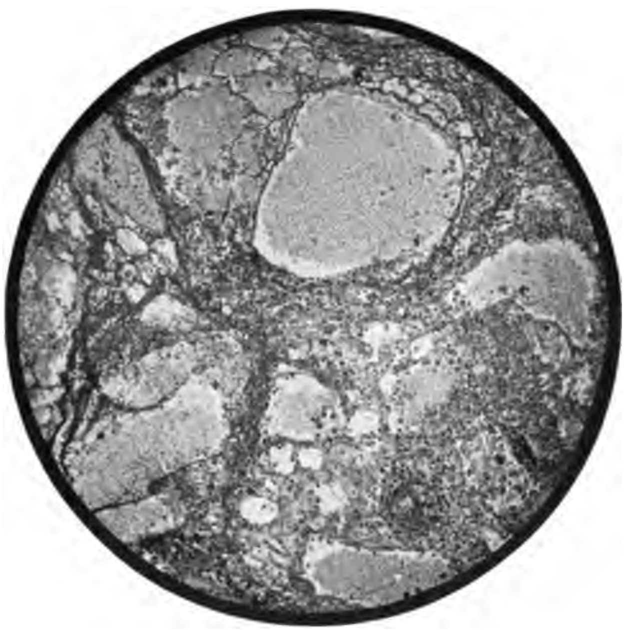

Fig. 5. × 81.6. (Low power.) From cystic portion of tumor transplanted from Rat 3, third generation, showing tendency to cyst formation persisting in transplanted tumors; to be compared with Figure 2 of Dr. Loeb's tumors.

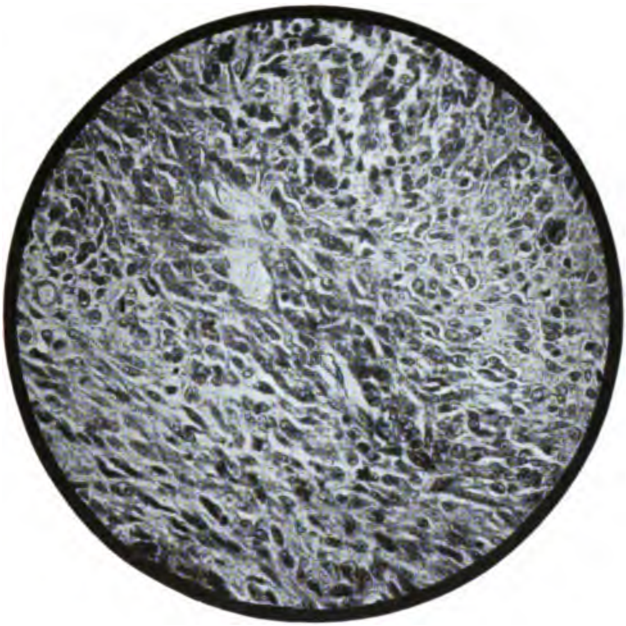

Fig. 6. × 280. (High power.) Sarcoma tissue from transplanted tumor, first generation from Buffalo Rat 3; to be compared with Figure 3 of Dr. Loeb's tumor.

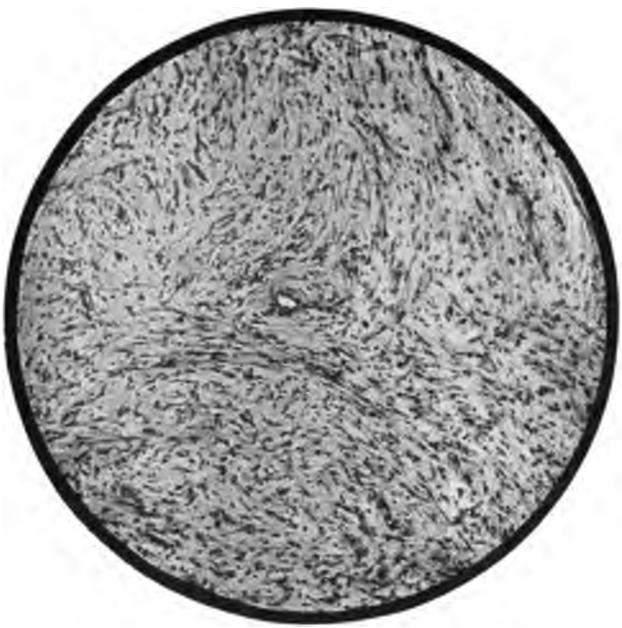

Fig. 7. × 81.6. (Low power.) Section of primary tumor of Rat 1, fibrosarcoma on abdominal aspect. First rat discovered in cage in 1904.

Fig. 8. × 280. (High power.) Primary tumor of Rat 2, showing fibrous character of primary tumor.

Fig. 9. × 280. (High power.) Buffalo Rat 2. Section of metastasis in median fissure of liver, showing sarcomatous character of tumor and the tendency to formation of intracellular fibrous substance.

In the spring of 1902 Dr. Loeb was engaged in the transplantation of the second tumor and at our invitation came to the State Cancer Laboratory in Buffalo, bringing with him a number of inoculated rats from the second tumor. This tumor had at that time been transplanted through a number of generations. For his accommodation two large cages and a number of smaller ones were made. During the course of his stay in Buffalo these cages all contained, at one time or the other, numbers of successfully inoculated rats. In October, 1902, Dr Loeb went to Montreal, taking his rats with him. Some inoculated rats were left in the cages but none of these developed tumors, and by December, 1902, the remainder were disposed of. *During the period from December,* 1902, *until the summer of* 1903, *there were no rats in the laboratory.* The smaller cages were placed in the hot-air sterilizer and sterilized; the two larger, being too bulky for this procedure, were brushed out and stored in the back part of the animal room, where they remained unused until the summer of 1903, when they were employed for a number of rats brought into the laboratory for purposes of study other than tumor implantation. These rats were killed at various periods and on the conclusion of the work perhaps a dozen rats were left in the two large cages; in one cage four rats, in the other six or eight. This entire lot of rats was obtained from a totally distinct source from those which Dr. Loeb had employed.

In July, 1904, in one of the two large cages, which had not been subjected to sterilization after Dr. Loeb's departure, and which at that time contained four rats, a rat was discovered with a large tumor on the right abdominal aspect and a smaller tumor adjacent to it in the axillary region, about the size of a hazelnut. The large tumor was movable, dense, and about the size of an English walnut. The rat appeared to be in good condition and on July 12th, the large tumor was removed by operation. It proved on section to be a slow-growing fibrosarcoma. Portions of the tumor were inoculated into a number of rats but none of these subsequently developed tumors. There was no local recurrence of the tumor at the site of the operation, and on the death of the rat some months later the smaller nodule in the axilla was found not to have changed in size. The remaining rats were removed from both cages.

Eight rats from an entirely new source were now placed in the cage in which the tumor had appeared. In the other cage of similar size were placed six or eight rats from the same source as the rats now placed in the infected cage. Both cages were now removed to the basement. They had previously been in the animal room of the laboratory, which is on the fourth floor. The conditions in the basement were not essentially different, except that the room was not so well heated and possibly more damp. The rats remained undisturbed in these cages in the basement of the laboratory from August, 1904, until October, 1905. At that time three adult rats were in the cage in which the first tumor had been found. They were the survivors of the eight which had been originally introduced into the cage in August, 1904, five having died of intercurrent disease (tuberculosis), one three-quarters grown female which had obviously been born in the cage and a litter of ten half-grown rats, not over six months old, all of these the offspring of the adult rats originally placed in the cage. Of the three adult rats, two were males, one a female. The two males were found on examination each to have a large tumor. One of these had a tumor located on the right side of the abdominal aspect directly behind the right fore-leg. It was about the size of a fifty-cent piece, 1 cm. in thickness. The other male adult rat possessed a tumor the size of a walnut in the thyroid region. This tumor, because of its great size, embarrassed the respiration of the rat and it died October 6th. This rat is known as Buffalo Rat. 1. The notes of the autopsy are as follows:

The tumor occupies the thyroid region and extends from the chin to the sternum. It is nearly spherical. It measures 35 mm. in the long axis by 45 in the transverse axis. The skin over the tumor is thin, of bluish appearance, but everywhere perfectly movable. The tumor is fixed at its base, is nowhere adherent except in the median line in the deeper portion of the neck. The greatest thickness of the tumor is 35 mm., its weight is 19.8 gm. On dissecting up the tumor it is found to be distinctly encapsulated, easily dissected from the skin, with areas of deep purple mottling on its superior surface and injected blood vessels in the capsule. Toward the base the tumor is of lighter color and greater consistence. It is easily dissected down to a point where its anatomic relations correspond with the thyroid. There is no evident compression of the trachea.

On opening the abdominal cavity the mesentery is found to contain a considerable amount of fat. Intestines are collapsed and pale. The liver is greatly enlarged and presents a typical nutmeg appearance.

Fig. 10. Buffalo Rat 1. Large fibrosarcoma of abdominal aspect. Found in cage, July, 1904, which had contained Dr. Loeb's rats in 1903.

Fig. 11. Buffalo Rat 2. Large fibrosarcoma of abdominal aspect. Developed tumor in same cage and was first observed, October, 1905.

On examination of the lungs the lower lobe on the left side is found to be in a state of consolidation, with mottlings of deep red, on which are distributed well-defined areas of pale white. The upper middle lobe on the right side shows the same condition. The left adrenal is enlarged, hyperemic and nodular in appearance, is very friable on removal. The kidney is soft and large. The right adrenal is small and of normal appearance. Kidneys on both sides present the same appearance, somewhat enlarged, dark red, granular surface.

The liver on section presents the characteristics of high-grade fatty degeneration and cyanosis, typical nutmeg appearance. The spleen and pancreas appear to be of normal size and appearance. The retro-bronchial lymph nodes are not enlarged, the mesenteric lymph nodes are also not enlarged. The enlarged left adrenal on section is of dark red color, friable and soft.

On opening the tumor the left half is found to consist of a thick-walled cyst containing clear, straw-colored fluid which, on exposure to the air, coagulates. The wall of the cyst is pinkish white, the interior smooth and glistening. The right lobe of the tumor consists of friable, pinkish white tissue, with large areas of hemorrhage. The entire tumor, after removing specimens for microscopic examination, was ground up with salt solution and injected into rats.

Histologic examination of this tumor shows it to be a spindle-celled sarcoma, containing frequent cysts. Here and there in the primary tumor are remnants of thyroid epithelium, arranged in the form of irregular nests, but showing no evidence of proliferation. The typical sarcomatous structure is well-defined at the margins of the large cystic cavity, which forms the bulk of the tumor. After removing sufficient material for hardening, the remainder of the tumor was broken up into small pieces, under aseptic conditions and used to inoculate ten white rats and six parti-colored rats, by placing small pieces of the tumor beneath the skin with a sterile trocar. Four rats were also inoculated with the serum obtained from the large cystic cavity. The result of the first attempts at inoculation yielded four tumors, all in the white rats, none appearing in the parti-colored; two of these in white rats inoculated with fragments of tumor through a trocar, and two from the four rats inoculated with the serum of the cyst cavity.

From the four tumors thus obtained the tumor has now been carried to the tenth generation of successful transplantation. In the course of inoculation we have had one or two tumors develop in the parti-colored rats, and although the percentage of successful inoculations is not as yet very high, the virulence of the tumor

and the percentage of successful inoculations appear to be increasing.

Sections from the tumors obtained by implantation present the histologic characteristics of the primary tumor. These tumors grow to great size and in the later days of the disease rapidly form cysts, by taking on large quantities of serum. The behavior of these tumors is in every way like the implanted tumors which Dr. Loeb had in the laboratory in the spring and summer of 1902. These histologic characteristics of the tumor, both in the primary and implanted tumors, differ from Dr. Loeb's primary and his secondary implantations, only in minor details. They show the same characteristic structure of sarcoma tissue into a network surrounding the cysts. The only point of difference is an occasional appearance in the arrangement of the cells which suggests alveolar sarcoma, but most of the tumors are of the simple spindle-celled variety.

The second rat, Buffalo Rat 2, found in the cage in October, 1905, was in good condition. On October 23d this rat was subjected to an operation at which the tumor was removed. At the operation it was found that the tumor extended beyond the median line. There was a small nodule detached from the tumor on the thoracic aspect and this was left *in situ,* after being cut in several directions with sterile shears. The tumor weighed 19.8 grams. It presented the macroscopic appearance of a fibrosarcoma. It was transplanted into twenty white rats. On section it proved to be a fibrosarcoma, identical in appearance with the tumor in the first rat discovered in the cage in the summer of 1904. Attempts at transplantation were all unsuccessful, no tumors developing in the twenty rats inoculated. The rat lived until January 10, 1906, when it was found dead in its cage.

The autopsy showed that the nodule which was left in place at the operation in October had increased in size, had infiltrated the surrounding tissues, and proved on section to be somewhat softer than when incised at the time of operation. The liver showed marked evidence of fatty degeneration. In the median fissure between the right and left lobes was a large metastasis of irregular shape, somewhat larger than a hazelnut. It involved the structure of the liver and on section was pinkish white in

Fig. 13. Buffalo Rat 3. Primary cystic sarcoma of thyroid developed in cage at the same time with Buffalo Rat 2, October, 1905.

color. On elevating the liver numerous mesenteric metastases, one somewhat larger than a pea, and numerous metastases scattered over the peritoneal surface of the intestines, spleen and mesentery, were found. The tumor material and organs of the animal appeared to be badly contaminated and transplantation experiments were not undertaken. Histologic sections of the metastases of this tumor showed that it had assumed the characteristics of a rapidly-growing spindle-celled sarcoma.

During the period in which these three tumors were found in one cage, in the State Laboratory, no tumors appeared in the control cage, in which there were kept approximately an equal number of rats during the entire period, nor in the other cages in the laboratory, although during the greater part of the time there were no less than 100 rats in various cages. No tumors developed in the smaller cages which were used by Dr. Loëb, but which were subsequently sterilized.

Sarcoma of the thyroid in the rat appears to be a rare affection. We have been unable to find reports of this disease except in the case of the three primary tumors observed by Dr. Loeb. For the purpose of ascertaining how frequent this affection might be, there was sent from this laboratory to 325 breeders of small animals in the United States a postal card on which was printed a photograph of Rat 1, with the inquiry as to whether or not these dealers had observed any case of a rat with a similar tumor in the neck and offering $25 reward for each animal so affected. The inquiry was also made as to how many white rats the dealer had observed or handled during the preceding three years. Answers were received from fifty-seven dealers, who reported having had approximately 20,000 white rats in their establishments. All but one or two stated they had never seen anything like the photograph of Rat 1, and none were able to give a description which clearly indicated that they had observed anything but abscesses or indefinite swellings in other regions in their animals.

A summary of the facts in this observation is as follows: There were seven rats in all which survived in the infected cage. In the first instance four rats remained in the cage for a period somewhat over a year. One of these developed a large fibrosarcoma on the abdominal aspect. In the second case three rats

survived in the cage a period of fourteen months. Two of them developed sarcomas, one, Rat 1, a primary sarcoma of the thyroid, Rat 2 a fibrosarcoma on the abdominal aspect. The histologic findings showed that the first fibrosarcoma and the second fibrosarcoma were neither transplantable. They presented the same histologic characteristics. The first one was totally removed and did not recur. In the second a nodule was left *in situ* and the animal died with abundant metastases of rapidly-growing spindle-celled sarcoma. These tumors must then be looked on as malignant tumors, although they were not transplantable and the first one did not recur. The thyroid tumor presents all the essential characteristics of Dr. Loeb's sarcoma of the thyroid, implanted rats from which had previously occupied this cage.

It would be natural to attempt to separate the two fibrosarcomas from the transplantable and rapidly-growing sarcoma of the thyroid, and we should have expressed a possible doubt that they were derived from the same form of contagion, were it not for the recent experiments of Ehrlich and Apolant, which have demonstrated beyond doubt that even a carcinoma can, under given conditions, lead to the development of a sarcoma in connective tissue immediately adjacent to it. For this reason it would seem an unnecessary refinement to consider that the three cases of sarcoma, although in different regions in the animal and somewhat different in histologic details and experimental characteristics, were attributable to other than a common source. In the light of Borrel's[2] observations on the endemic occurrence of carcinoma in mice, in which he succeeded in tracing the origin of twenty mouse tumors to one cage, it would seem that the source of infection in this case is vested in the cage in which these rats were contained. That we may positively exclude heredity is owing to the fact that the rats which occupied the cage from 1903 to 1904 were derived from a distinct source in a widely distant city from the rats which occupied the cage from 1904 to 1905. That local environment is not the essential factor is shown by the fact that the cage occupied space in the animal room on the fourth floor of the building from 1903 to 1904; from 1904 to 1905 in the basement of the laboratory.

The most logical explanation of the manner in which this cage became infected with the contagion of sarcoma is found in the fact that it was used in 1902 by Dr. Loeb, who kept in it at that time rats inoculated with the second cystic sarcoma of the thyroid discovered in Chicago. It is to be noted that a period of three years elapsed from the time of its employment by Dr. Loeb to the development of the primary cystic sarcoma of the thyroid in 1905. From this it would appear that the contagion of sarcoma in the rat is extremely persistent as to time, extending over a period not less than one-third the life of the rat.

It is of interest to note that two of the three primary sarcomas of the thyroid in Chicago were first detected in the summer or autumn; that all three of our rat tumors were likewise detected during the summer or autumn, and that in both cases a period of approximately one year intervened between the development of the different tumors. From this it seems probable that the incubation period, or the period in which a rat must be exposed to the contagion, must extend over a number of months. Our cage at present contains a number of rats which have been undisturbed in it since October, 1905. To these have also been added a number of rats during the past month. The conditions of the cage are unchanged. These rats have been obtained from another source distinct from that of any of the rats thus far employed, and a further report will be made after sufficient time has elapsed to make it probable that tumors will or will not develop.

Our second observation relates to the endemic occurrence of cancer among mice in the establishment of a dealer who has been engaged in the raising of these animals for several years, in Springfield, Ohio. In view of the completeness of the data placed at our disposal, we consider that this case affords the most striking illustration of cage infection thus far reported.

One of us visited the establishment in question June 8, 1906, in the company of Dr. Rand, of Springfield, who heard the entire statement made by Mr. Landes, the owner of the establishment and a man of intelligence. The statement which he gave us regarding the occurrence of these tumors, many of which came under our own personal observation, appeared to be perfectly logical and entirely free from discrepancies. In the course of the

previous year Mr. Landes had sent this laboratory six white mice with spontaneous tumors, which proved on microscopic examination to be adenocarcinomata of the breast. They were all in females and all located on the abdominal aspect. We found on inquiry that Mr. Landes recognized the fact that the source of these tumors was one old cage, built of wood, one end of which was screened off with netting. He stated that the cage was three years old and that it had contained for three years an average of about 100 old mice. He estimated that these mice bred to such an extent that he was able to get between one and two thousand young ones out of this cage, annually.

The history of this cage is as follows: It was built in July, 1903, at his place of business, which was then at the corner of Shafer and Columbia streets, two and one-half miles distant from its present location. It was kept in a barn, the boards of which were poorly matched, and the place was cold and windy in winter. It remained nearly a year in this barn and contained during this period about 100 mice. During the course of the winter he found one or two mice with tumors in the cage. In April, 1904, he moved to the corner of Light and Cedar streets, two or three squares from the first location, and the cage was kept in a large coal shed, which was warm and comfortable. It remained from April to November, 1904, in this locality and during that period he removed from the cage twenty-five to thirty mice with tumors. In November, 1904, he moved to his present location, two and one-half miles distant from the first two mentioned. Before the cage was removed from Light and Cedar streets he observed twelve mice at one time with tumors, and for the purpose of ridding himself of this unfortunate development of tumors he decided to change entirely the stock in the cage. All the mice which had occupied the cage were removed and twelve adult, healthy mice, ten females and two males, were imported from Washington, D. C., and introduced into the cage, which was placed in a small, detached outhouse, at least fifty feet distant from the present location of the cage. During the course of this winter three or four tumors developed.

Since the spring of 1905, the cage has been in a large room thirty by fifty feet in size, which was previously a dance hall and

it now stands on a table six to seven feet from a window where the conditions of light and ventilation are excellent. It previously stood in a different position in the room about twenty feet from its present location. During the last year he has removed between twenty-five and thirty mice with tumors from the cage, several of which have been sent to us. Owing to a misunderstanding on his part he had the idea that only tumors between the front legs were what we desired, and those which appeared on the flanks or lateral aspect of the abdominal region he killed. At the time of my visit one mouse was in the cage with two large tumors on the right abdominal aspect. He pointed this out as an example of the kind of tumors which he thought we did not require. He states that he has never seen a tumor on the back of any mouse. He thinks they were mostly females, and in several instances when he examined them as to their sex he found they were females. He has never seen a male with a tumor. The tumors have frequently grown to great size.

Besides the old cage, his establishment contains twelve or fifteen other cages of similar construction. One of these is two years old, the remainder one year old. They are regularly stocked from the old cage. His custom is to remove from the old cage twelve or more females with one or two bucks and place them in the new cages and allow them to remain there until each cage contains approximately 100 mice. The half and three-quarter grown offspring are removed and sold. In the cage which is now two years old he has during the past year observed four to six mice with tumors. So far no tumors have appeared in mice in other cages in the establishment. He remembers having seen one or two tumor mice in some of his old cages in his previous establishments, but these cages were always stocked from the old cage already described, which seems to have been the source of all his operations, and which he referred to as his incubator. The cage was purchased by the laboratory and brought to Buffalo with the mice in it. On reaching the laboratory it was found to contain three mice with large tumors. The interior of the cage is dark and damp, incrusted with excreta and presents a generally unhygienic appearance. Examination on the date of sending this manuscript for publication, August 3, shows that the cage contains

twenty-eight adults and perhaps twice as many half-grown and young mice. On the floor of the cage is the carcass of a mouse which has apparently been dead some hours with a large tumor on the abdominal aspect. This is ulcerated and shows evidence of having been gnawed. A second mouse with a tumor the size of a large hazelnut protruding between the hind legs and evidently springing from the posterior part of the mammary tissue is also found. The skin over this tumor is adherent and the tumor is evidently far advanced.

Briefly stated, the facts in the above case are as follows: A cage has been discovered in which upwards of sixty spontaneous tumors have occurred in the course of three years. The fact that the location of the cage was frequently changed and the stock entirely renewed on at least one occasion without any permanent interference with the production of tumors, makes it apparent that the cage itself was the source of infection.

Besides these observations which point directly to the cage as the source of infection, the endemic occurrence of cancer among mice in breeding establishments is well known and is illustrated to a remarkable degree in our own experience. For instance, from January, 1905, until the present time, this laboratory has had a standing reward of $25 for any small animal affected with cancer. This offer, as already stated, was sent to 325 dealers in pet animals. It is possible that many of them have not appreciated the significance of the offer, or have overlooked cases of cancer in their stock, but during this period we have had constant business relations with seven dealers in different parts of the country, from whom we have purchased large numbers of mice, and who, we feel perfectly certain, have fully appreciated the monetary value of cancer mice. From one of these dealers we have received no less than eighteen female mice with cancer of the breast; from a second dealer, five of the same nature and sex; from two other dealers, one each, and from three from whom we have had repeated shipments of mice, none whatsoever. From one of these dealers from whom we have received in the last two years not less than 1,200 normal mice, we learn that he has never, in his own stock, seen an example of cancer of the mouse, but that he was able

to recognize the affection was shown by his having secured for us from another dealer a single specimen.

These figures conclusively indicate that in certain breeding establishments cancer in white mice is endemic. The condition of affairs in the breeding establishment of a dealer in Massachusetts is interesting when compared with that of the Springfield dealer where the evidence pointed to a single cage as the source of infection. This Massachusetts dealer has shipped to us, in all, eighteen cancer mice, in lots of nine, four and five, and it is of great interest that the tumors in all of these mice were of relatively the same size. On inquiry as to where the tumors had developed, if they could be traced to a given cage or group of cages, we were notified that the mice were scattered indiscriminately through the entire establishment. This condition of affairs was so interesting that we made a trip to Massachusetts to personally inspect the premises, whereupon it was found that this dealer, in order to combat infections and contagious disease had her stock distributed among a large number of small boxes. These mice were moved about from box to box and the different families were regularly subdivided and used for the purpose of forming new families. This practice is entirely different from that of the Springfield establishment and easily explains the general distribution of the tumor mice through the different breeding boxes. The fact that the tumors have developed in lots of half a dozen or more at one time and that in the various shipments to us the tumors have been of relatively the same size, suggest that small epidemics have occurred at frequent intervals. The attempt to trace the origin of the infection to any particular box in the establishment is, of course, under the present system, impossible, and it is not improbable that this method has led to the dissemination of the contagion through a large number of the boxes.

The foregoing observations indicate that both sarcoma in rats and carcinoma of the breast in mice must be looked on as contagious, and when considered in conjunction with the classical observations of Loeb[4] and Borrel,[2] in which, however, it was impossible entirely to exclude the factor of heredity, should lead us to pay more serious consideration to the interesting statistics

constantly accumulating which show the probable infection of the surroundings of human cancer cases in so-called "cancer house." It should also lead to earnest consideration of the desirability of sterilizing the dressings of cancer cases and the complete sterilization of rooms which patients have occupied, and it should, at least, to no inconsiderable extent, offset the recent statement of Hansemann, that we have no right to add to the difficulties of the cancer patient by the unnecessary suspicion that he is suffering from an infectious disease. It should tend to combat the belief among pathologists that there are no grounds for even suspecting an infectious factor in malignant tumors.

A Study of the Influence Exerted by a Variety of Physical and Chemical Forces on the Virulence of Carcinoma in Mice, and of the Conditions Under Which Immunity Against Cancer May be Experimentally Induced in These Animals.*

Being a Paper read in the Section of Pathology at the Annual Meeting of the British Medical Association, Toronto, August, 1906.

BY G. H. A. CLOWES, PH.D.

The discovery of the ease with which mouse tumors may be transplanted from one individual to another has led to the development in the course of the last few years of an entirely new field of experimental research in cancer. A large amount of data regarding the nature of these mouse tumors and the conditions under which immunity may be established against them has been accumulated in the New York State Cancer Laboratory in the last two years. This work has been carried out for the most part by Dr. Gaylord and the writer, with the co-operation of Professor Calkins of Columbia University, and the assistance of Mr. Baeslack and other members of the laboratory staff.

It is proposed to give a brief summary of certain biophysical and biochemical experiments dealing with the stimulating or inhibiting action of heat, and of certain chemical bodies upon tumor materials. It is also proposed to present evidence regarding the existence of a definite immunity against tumor development, and to indicate briefly the methods whereby an artificial immunity has been induced in certain cases.

In addition to the Jensen tumor, for the gift of which we are indebted to Professor Jensen of Copenhagen, 35 primary tumors have been placed at the disposal of the laboratory in the course of the last two years. Of 15 employed for transplantation 3 which were infected caused the death of the mice employed, and 7 out of the remaining 12 gave positive results, 18 tumors being obtained from 204 mice inoculated.

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It will thus be seen that our percentage yield from primary tumors compares with that of Bashford and is higher than that of Ehrlich.

Three distinct strains of mouse carcinoma derived from entirely independent sources are now being employed in our laboratory for experimental purposes.

1. The well-known Jensen tumor, the virulence of which, whilst varying within very considerable limits, shows an average over any great length of time of about 30 per cent., both in our hands and in those of other investigators. This tumor develops relatively slowly, causing the death of the mouse in the average of a large number of cases in fifty-six days from the date of inoculation. About 22 per cent. of the tumors of this series recover spontaneously.

2. Known as the Brooklyn tumor, derived from a primary tumor sent to the Gratwick Laboratory in May, 1905. This tumor has now reached, in fifteen generations of transplantation, an exceptionally high degree of virulence, the last 612 mice inoculated having given 557 fatal tumors, or 91 per cent. The average duration of the life of the mice from the date of inoculation to the date of death has been twenty-six days, the average weight of the tumors slightly over 4 grams at death. This tumor was fairly virulent at the start, giving 5 tumors in 28 mice in the first generation, and it is interesting to note that with transplantation through succeeding generations the percentage yield of tumors rapidly increased, whilst the period in days intervening between the date of inoculation and the fatal termination of the disease steadily diminished. Thus the average of the first, second, and third generations shows 19 per cent. of tumors requiring an average of seventy-four days for development. The fourth generation shows 46 per cent. of tumors requiring forty-one days for development. The fifth and sixth generations show 69 per cent. of tumors, with an average of thirty-two days; whilst, as stated above, the seventh to the fifteenth generations have shown over 90 per cent. of tumors, requiring an average of twenty-five to twenty-six days for development. The great increase in virulence in this series is certainly not attributable to rapid transplantation of small tumors, as seems to have been the case in

Ehrlich's highly virulent series. We find, on the contrary, that tumors under 2 grams give very unsatisfactory results on transplantation, whilst the best yields are obtained from large, moderately-necrotic tumors which have already reached a stage at which the animal may be expected to succumb in the course of two or three days. The number of spontaneous recoveries occurring in this series is extremely small, at the present time less than 4 per cent.

3. A tumor known as the Springfield tumor, possessed of a very low degree of virulence, far less than that of the Brooklyn, and considerably less than that of the Jensen tumors. This series has only been established and maintained by incubation of the tumor materials at temperatures ranging between 38.5° and 41° C. for half an hour or more previous to inoculation. Primary tumors of this type had invariably failed to produce tumors in the following generation until the incubation method was employed, 13 tumors being obtained from incubated material before any were obtained from normal material. A comparison of the normal and incubated lots in this series shows at the present time 20 per cent. of tumors in the normal as against 57½ per cent. in the incubated. The relatively low virulence of this tumor at the start was associated, as might be expected, with a fairly high percentage of spontaneous recoveries, over 30 per cent. The series being now only in the seventh generation, it is too early to make any positive statements regarding its exact degree of virulence and tendency to retrogression.

From the statistical results recorded above it must be concluded that:

1. The virulence of a tumor bears a definite relationship to the average speed of development of the tumor; that is to say, the larger the percentage yield obtained on transplantation of a tumor the more rapid will be the development of the tumors of that series and *vice versa*.

2. The greater the virulence or speed of development of a given series of tumors the smaller will be the proportion of spontaneous recoveries in that series, and *vice versa*.

EXPERIMENTAL METHODS

Every possible effort has been made to eliminate so far as possible those errors commonly associated with animal experiments, both by employing large numbers and also by insuring a uniform dosage on inoculation. The procedure is as follows:

A tumor is ground up in a mortar with a given volume of salt solution, the connective tissue residues removed by means of fine rakes, and uniform doses of the macerated tumor material introduced subcutaneously into each mouse of a series. In case it is proposed to study the relative effect of a series of chemicals or any other agent like blood serum, calculated to inhibit the development of the tumor cells, equal amounts of the uniform macerated cancer material are treated with uniform doses of the bodies in question, and allowed to stand for equal periods of time. Mice derived from the same source and of the same size are then divided into a series of lots containing ten or more individuals apiece. A batch of mice is employed for each of the prepared admixtures of cancer and chemical or serum, the greatest care being observed that not only do all mice in the same batch receive an exactly equal dose, but also that all mice in the same series receive exactly the same amount of cancer material, so that the only varying factor is the chemical body or serum admixed therewith.

Further, in order to maintain a complete control of every individual mouse in each series, with a view to observing the occurrence of tumors, their speed of development, and final fatal termination or spontaneous recovery, a system of charting has been introduced whereby a permanent record of the progress of each tumor from the date of inoculation to the date of death of the animal is preserved in the laboratory.

SPONTANEOUS RECOVERIES[1]

The adoption of the above charting system enabled us to detect the occurrence of spontaneous recoveries very shortly after the commencement of the transplantation work on the Jensen tumors. Excluding all tumors the diameter of which was not equal to 3½ mm. not less than twenty days after inoculation, we found that

[1] For references see page 534.

upwards of 100 definite spontaneous recoveries had occurred in the Jensen series alone previous to January 1st of this year, the tumors varying in size from the minimum to a weight of three or four grams.

To summarize the statistical results obtained in this work, it may be said that the larger the yield of tumors and the more rapid their growth the smaller is the number of spontaneous recoveries; and also that the more advanced is the tumor in its development the smaller are its chances of retrograding. It would in fact, appear probable that a very large number of spontaneous recoveries occur previous to the time at which the tumor has reached such dimensions as to be readily recognizable.

INFLUENCE OF INCUBATION [2]

Whilst all tumor cells appear to be destroyed at 45° C., incubation of the macerated tumor materials previous to injection, at temperatures ranging from 38.5° C. to 41° C., for periods of twenty minutes to half an hour, appears to exert a stimulating effect upon tumors possessed of a low degree of virulence. On the other hand, tumors possessed of a high degree of virulence suffer considerable attenuation when subjected to such a treatment. This remarkable fact was first recognized whilst attempting to immunize animals against subsequent injections of tumor materials by treating them with incubated material, which it was anticipated would lose thereby in virulence to a sufficient extent to enable the animal to overcome it by natural means. The incubation of weak tumors, as stated above, has proved of considerable value from an experimental standpoint, one series of tumors having been established entirely in this manner.

ACTION OF CHEMICALS IN INHIBITING DEVELOPMENT OF TUMORS

In a considerable series of experiments mercuric chloride, potassium cyanide, ammonium fluoride, and other bodies of this nature were admixed with normal tumor materials in varying proportions with a view to determining —

1. The point at which development of the tumor cells would be absolutely inhibited.

2. The action which materials treated in this manner would have in developing an immunity in the animals so treated.

3. A possible means of removing bacteria from infected tumors.

The resistance of the tumor cells to inorganic disinfectants was found to be extremely high. Treatment of the cancer material for one hour previous to inoculation with mercuric chloride at a concentration of 1 in 3,500 was insufficient to prevent the development of a small proportion of slow-growing tumors, final complete destruction of the cells being effected first at a concentration of 1 in 2,000.

Mercuric iodide effected a similar result at a concentration of from 1 in 2,000 to 1 in 2,500.

The action of potassium cyanide was most remarkable. The powerful, highly-virulent Brooklyn tumor still gave 100 per cent. yield after treatment with potassium cyanide at a concentration of N/250, and tumors were produced both in this and the Jensen series when the concentration of potassium cyanide was raised to N/100. In one experiment in which ten mice were employed, the concentration of potassium cyanide was so high that half the mice succumbed within a couple of hours after receiving the injection, in spite of which one large and one small tumor developed in the remaining five, thus showing that the resistance of a tumor cell to potassium cyanide is greater than that of the mouse itself.

Bacteria are entirely destroyed by treatment with potassium cyanide at a strength of N/200, and in one series in which the tumors were seriously infected, thus causing the death of the animals, the treatment of a portion of a tumor with potassium cyanide at a concentration of N/200 resulted in saving a considerable portion of the animals and the production of several tumors.

Ammonium fluoride inhibits all tumor development at a concentration of 1 in 1,000, a few small tumors making their appearance at 1 in 2,000.

The reinoculation of those mice which received the injections of materials which had been previously rendered innocuous through treatment with chemicals gave no indications of immunity.

Careful examination of the percentages of tumors in the vary-

ing groups, and the rate at which the individual tumors develop, would indicate that not only do the tumor cells offer a great resistance to the action of the disinfectants referred to above, but also that at suitable concentration a distinct stimulating effect may be observed when compared with the normal, similar to that observed by Biernecke in studying yeasts.

The discovery that rapidly-growing tumors contain a large proportion of potassium[3] and slow-growing tumors a large proportion of calcium, led us to test the effect of substituting isotonic solutions of potassium and calcium chloride for the ordinary salt solution in admixture with the cancer material. The mice which received potassium injections and were subsequently fed on food containing potassium in considerable quantities showed a larger percentage of tumors than did those treated in a similar manner with calcium. We propose, however, to repeat this experiment before attaching any importance to the results obtained.

IMMUNITY

It is necessary at this stage to refer briefly to the results already published on immunity against cancer. That immune forces exist antagonistic to cancer development in mice is now an established fact. In January, 1905, a paper was published from our laboratory and read at Johns Hopkins University,[4] in which it was stated:

1. That in the Jensen series mice recover from true tumors in at least 20 per cent. of cases.

2. That small tumors treated with serum of such mice might be retarded in development and in a few cases cured, whilst those treated with normal serum showed a less marked effect.

Whilst a considerable number of such recoveries had already been reinoculated, it was not possible at that early stage to furnish any reliable data regarding the chances of their developing tumors. On July 15, 1905, a second paper,[5] affording further evidence of immunity, was sent to the publisher. In this paper it was shown that thirty spontaneous recoveries from genuine tumors on reinoculation, many of them for the third time, had failed to show a single tumor, whilst those which had not recovered from tumors on first inoculation showed a few tumors,

and normal animals the usual 30 per cent. yield. In one series the mice were intentionally inoculated with an extremely weak strain, with the result that 50 per cent. showed abortive tumors, and subsequently recovered, whilst the remainder gave no indication of tumor development. Those that had recovered on the first occasion failed entirely to develop tumors on further inoculation with a far more virulent material, whilst the remainder that had not developed tumors on the first inoculation showed a fair proportion of tumors after inoculation with the more vigorous strain.

A further experiment carried out at this time, treating tumor materials previous to inoculation with the serum of spontaneously recovered mice, in comparison with that of normal mice, showed that whilst 31 per cent. of tumors were obtained in the normal series, only 12 per cent. were obtained in the immune series, or, if rapidly-growing tumors only were considered, 24.8 per cent. in the normal series, as against 5.6 per cent. in the immune series. In his report[6] of that year Bashford criticized our preliminary communication, stating:

1. That only one spontaneous recovery had occurred in his experience with 3,000 tumors in the Jensen series after fourteen days' growth, and that our large percentage of spontaneous recoveries was to be accounted for by assuming that some septic process following inoculation had given rise to swellings in the subcutaneous tissue which were in no sense to be looked upon as tumors.

2. That whilst transplantation fails on the first attempt in a certain number of animals, subsequent inoculation gives almost the same percentage as first obtained, and that the variations in the success attending transplantation in unused mice, and any mice which have been inoculated unsuccessfully, are not greater than those obtaining in different series of unused mice.

Early this year, a paper dealing with spontaneous cure of cancer[1] was published from this laboratory, in which upwards of 100 such spontaneous cures were carefully investigated from a pathological and statistical standpoint, and no doubt remains that true, growing tumors had existed in every one of the cases dealt with. Subsequent efforts to reinoculate these 100 mice were without result. Bashford's contentions that our spontaneous

recoveries were ulcerations and that all mice might be reinoculated successfully, were, therefore, both disposed of.

Unfortunately, owing to a severe epidemic in which we lost upwards of 3,000 animals and barely retained our valuable tumor mice for subsequent work, a large proportion of the spontaneous recoveries were lost in the course of the winter, and it has consequently been found impossible, up to the present time, to repeat the experiments referred to above, treating tumor material with immune serum previous to injection.

In April of this year, Ehrlich[7] published an exhaustive discussion regarding immunity against mouse tumors, in which he demonstrated, with figures more elaborate than those which we, with our smaller facilities, were able to present, that mice which have survived a first inoculation, even with attenuated materials, may remain immune when reinoculated for a second and third time with a far more virulent strain than that originally employed, a smaller percentage of tumors being obtained on each occasion, until finally the remaining mice are immune to all further treatment.

Ehrlich states (p. 89) that we had recognized the existence of immune forces in mice that had recovered spontaneously from cancer. He further notes, in a subsequent sentence, that Michaelis, after injecting carcinoma material killed by means of chloroform, had failed to find an immunity in mice so treated, an observation which he apparently considers contradictory to our results. Ehrlich then states on page 90 that, "instead of using chemically-destroyed carcinomatous material, as had his predecessors in this line of research," he was himself employing a living but weakened tumor strain as a means of inducing immunity. Ehrlich appears to have accidentally overlooked the fact that we were using mice which had recovered spontaneously from growing tumors, and have included our work with that of others who had attempted unsuccessfully to immunize mice by means of inanimate materials. Our very first experiences, more than two years ago, demonstrated the futility of any such method as that which Michaelis had employed, and we were the first to emphasize the role played by the living cell in inducing immunity. We still believe that an actual growth must take place in order that im-

munity may be conferred. We are, and since the commencement of our experiments have always been, convinced that immunity against cancer is not induced by means of any inanimate material, but only by the intervention of the living cells or virus.

A paper has just been published by Bashford[8] in which he apparently repudiates his own statements of the previous year, and confirms our results, although no statement appears to that effect. Bashford recognizes the occurrence of spontaneous recoveries in large numbers (in certain series as many as 50 per cent.), and, further, that on reinoculation a very small percentage of tumors is obtained from such recovered mice as compared with normal controls — a corroboration of our results. He finds, further, that all mice are not reinoculable, as stated in his previous report, and, whilst he obtains nearly the same percentage of tumors on the second as on the first inoculation, eventually a stage is reached at which the percentage yield on reinoculation is much lower than that of normal control animals — a further confirmation of the results obtained by Ehrlich and ourselves.

He states that body fluids of some protected mice when injected into mice with experimental cancer have given indications of a power to retard the growth of well-established tumors — a confirmation of the statement in our first preliminary report, to the effect that serum of spontaneously recovered mice exerts a more powerful influence on tumors in other mice than does the serum of normal individuals, leading in certain cases to a recovery and in others to a distinct retardation in the development of the tumor.

By making use of a feeble primary tumor, in which a large majority of the tumors that appeared recovered spontaneously, and subsequent inoculation with a more virulent strain, Bashford was able to demonstrate that a smaller proportion of tumors develop in those that so recovered, than in normal control animals, a confirmation of similar results obtained on a larger scale by Professor Ehrlich.

Finally, we would take exception to Bashford's statement that "we have at our disposal a means of protecting healthy mice from all the consequences of inoculating them with experimental cancer." Such a statement is, to say the least, misleading, unless,

indeed, the loss of a certain number of individuals in the process of immunization is ignored. It is to be hoped that in the future means will be discovered of immunizing mice with nonliving material. So long as it is necessary to take the risk of losing a certain percentage when inoculating with attenuated materials in order to confer immunity against more virulent materials, it cannot be stated that we have a means at our disposal of protecting healthy mice at pleasure.

Since the completion of the work referred to above we have carried out further experiments in the New York State Laboratory directed toward the demonstration of the existence of immunity. I would call your attention especially to one experiment demonstrating the existence of immune forces distributed throughout the bodies of animals already developing tumors of considerable size.

Very early in our experiments, the careful observation of charted records led us to recognize the fact that a large number of tumors apparently remain stationary at a certain stage of development, and at that time are more susceptible to the influence of X-rays, serum, and various chemical agents. Recognizing this fact, so soon as we had tumors of great virulence at our disposal, in which a yield of 95 per cent. could be relied upon, we started the following series of experiments, which, whilst carried out independently of Professor Ehrlich, must be looked upon as a confirmation of the results included in his recent paper under the heading of "Double Inoculations."

Ten series each of ten mice were inoculated at the head with a virulent tumor, with the result that the large majority showed developing tumors of a fair size in the course of five or six days. All those that showed such tumors were inoculated at periods from five to ten days after the first inoculation with a second dose of a tumor of the same or even more virulent strain, at the tail; in each case a series of unused animals being inoculated with the same materials at the same point, as a control. Whilst in the control series in the course of twelve or fourteen days from the time of inoculation, a yield of 95 per cent. of large tumors was obtained, in the series which had already had tumors at the head, previous to the second inoculation at the tail, only one or two

small tumors were to be found at the tail, the yield being less than 6 per cent. The fact that the presence of a fair-sized growing tumor inhibits the development of materials of the same virulence, and even of materials of greater virulence at the second point of inoculation, indicates to our minds the probability of the existence of powerful immune bodies in the serum.

It has long been recognized that metastases are formed with difficulty, and only in a relatively small percentage of cases reach any considerable size even in those mice which have large tumors.

It may well be supposed, from the above experiments, that the growth of a tumor meets with an energetic resistance on the part of the host; that antibodies of some type antagonistic to the development of tumor cells are produced in the serum, which, whilst powerful enough to inhibit the development of isolated cells, such as would occur in secondary inoculations and metastasis formation, are not necessarily sufficiently powerful to inhibit the development of the more virulent tumors. When, however, a tumor is retarded in its development, remains stationary, and eventually recovers spontaneously, it may well be supposed that such recovery is due to the natural production in the body fluids of the animal of antibodies antagonistic either to the tumor cells in their development or to some body within those cells stimulating them to proliferation. This theory finds support in the fact that such spontaneous recoveries are not reinoculable with tumors of the same virulence and show less tendency to inoculation with tumors of a higher grade of virulence than do normal mice; the resistance being apparently larger, the larger the tumor from which the mouse originally recovered.

We have collected the data accumulated in this laboratory regarding the reinoculation of mice which had failed to give tumors on the first inoculation. Excluding those cases in which the use of chemicals and high temperatures may be expected to have destroyed the tumor materials employed, it may be said that in the Jensen series from 30 to 35 per cent. of tumors are obtained on first inoculation; the second inoculation giving 10 per cent., and the third *nil*. We regret that the occurrence of an epidemic rendered it impossible to inoculate these mice, as would otherwise have been done, a considerable number of times.

In the Brooklyn series the last 400 mice have yielded 95 per cent. of tumors; the remaining 20, 3 or 4 of which had recovered spontaneously, gave 3 tumors on reinoculation. The immunity developed is not, therefore, as great as that observed by Ehrlich under similar conditions. The reinoculation of the survivors of less virulent strains, such as the Jensen and Springfield strain, with our more virulent tumor, whilst giving a yield considerably below that normally obtained from unused mice, would not indicate, especially if large doses are employed, that as great a degree of immunity had been conferred, as was found by Ehrlich in the results reported in his last communication on this subject. This difference may, however, be accounted for by the difference in our methods of transplantation, the probability being that a larger number of free tumor cells are introduced by the method which we employ than by that used in Ehrlich's laboratory; in which case the effect exerted by immune forces might be expected to be relatively less.

The evidences of immunity so far presented are:

1. The occurrence of spontaneous recovery from true tumors.

2. Such spontaneous recoveries are not reinoculable.

3. The reinoculation of mice which have failed to develop tumors on the first occasion with a tumor of an equal virulence leads to a reduction in the percentage, in Jensen tumor from 35 to 10 per cent., and in the virulent Brooklyn tumor from 95 per cent. to 20 per cent.

4. The reinoculation with virulent materials of mice previously inoculated with a weaker strain leads, as has been found by Ehrlich, to a reduction in the percentage of tumors as compared with the normal.

5. When mice are suffering from tumors of a certain size it is not possible, as found by Ehrlich and ourselves, to bring about development of a tumor at a second point by further inoculation.

6. The serum of recovered animals apparently produces a certain effect upon small tumors in other animals.

7. The serum of recovered mice appears to exert an inhibiting or retarding effect upon the development of macerated tumor material when admixed with the latter previous to inoculation.

ATTEMPTS AT ARTIFICIAL IMMUNIZATION BY MEANS OF INANIMATE MATERIAL.

Tumor materials were incubated at a temperature sufficiently high to entirely destroy the cells, so that no tumor development took place on subsequent inoculation. The mice, on reinoculation, after a considerable period showed no evidences of immunity.

The treatment of tumor materials previous to inoculation with chemicals, such as mercuric chloride, potassium cyanide, iodine, etc., at a concentration just sufficient to prevent tumor development, and subsequent inoculation of mice with this material, failed to confer on these animals any degree of immunity as compared with the normal.

The treatment of tumor materials previous to inoculation with immune serums — that is to say, the serums of mice which have recovered from cancer, whilst reducing the percentage of tumors on that occasion, does not confer upon the mice an immunity against further inoculation, these groups showing if anything a larger yield of tumors on the second inoculation than do other reinoculated series.

Chemical analyses[3] of over 350 tumors have shown that nucleoproteids, potassium, and other constituents of the cell nuclei were present in a relatively large amount in tumors possessed of a high degree of virulence which had developed rapidly, whilst the reverse was the case in slow-growing, feeble tumors, in which the element calcium was found to preponderate. This being the case, it was decided to attempt to immunize mice by means of one of the following processes, following the lines adopted by Beebe in his work on exophthalmic goitre: A suitable weight of tumor material was extracted with water or weak alkali for a couple of hours, filtered, and precipitated with acetic acid. The centrifuged precipitate was washed and redissolved in weak alkali, filtered, subsequently precipitated, and once more redissolved and used in definite doses in a series of mice, rats, rabbits, and chickens. The animals employed received four or five doses, increasing in amount, at intervals of from five days to a week, the amount finally injected being from eight to twelve times that used on the first occasion — a dose which would have proved fatal for many

mice. The tumors of upwards of 300 mice, belonging for the most part to our virulent strains, were used for this experiment, and an attempt was made to immunize in all 250 mice. The animals were inoculated from a week to fourteen days after receiving the last dose, but we have not so far been able to observe any indications of an immunity having been conferred upon the mice by such a direct treatment. The rats, rabbits, and chickens which had also received increasing doses of nucleo-proteids were killed and their serum used in comparison with that of normal animals of the same species, employing the method of admixing macerated cancer materials with the serums for an hour previous to injection. No result was obtained from rat and rabbit serum. In one case the serum of an immunized chicken appeared to retard development to a very slight extent; but since three other chickens similarly treated gave no result, this result will require further confirmation.

The nucleo-histons present in tumors were isolated by extracting with weak salt solution, precipitating with calcium chloride, centrifuging, dissolving in 3 per cent, sodium chloride, dialyzing, reprecipitating, etc. These nucleo-histons were used in the same manner as the nucleo-proteids, increasing doses being employed at intervals of five or six days. The results were in every sense negative.

From the above experiments it will be seen that great difficulties are to be anticipated in any attempt to immunize animals by means of dead material.

THEORETICAL CONSIDERATIONS

In conclusion it is necessary to refer briefly to certain interesting and suggestive theories recently advanced by Professor Ehrlich, by means of which he attempts to explain the proliferative energy of tumor cells, and the indications of immunity referred to above. Adopting his side-chain theory as a working basis, and assuming that all cells are possessed of side-chains or receptors, by means of which the necessary foodstuffs are attached to the cell, he considers the abnormally rapid growth of tumor cells is attributable either to an increased number of such receptors or

to an increase in the affinity possessed by such receptors for foodstuffs. As a result, in the establishment of equilibrium in the system, the cancer cells obtain a larger proportion of the foodstuffs available than do the other cells of the body. As a result of his experiments, Ehrlich concludes that the normal food affinities of the cell are either stimulated by a specific X body, the nature of which he does not further describe, or that some peculiar nutritive material essential to the development of the cancer cell has to be supplied, and in its absence the cancer cell fails to develop. He is, however, forced, in certain cases, to the conclusion that the immune forces exhibited, both by rats and mice that have developed an immunity after one or two injections of tumor material, are attributable to specific antibodies induced in the serum which he looks upon as cytolysins, and the formation of which he explains by assuming that the receptors of the tumor cells have become sufficiently changed to permit of the production of antibodies to them, which do not affect those of the normal body cells.

In developing a theory conforming with Ribbert's existing theory regarding the origin of cancer, Ehrlich has apparently ignored the possibility of some active stimulating agent foreign to the body being the cause of cell proliferation. It is well known that the normal protoplasmic functions can be stimulated to increased activity by chemicals, poisons, and bacterial toxins, and it appears to us possible to explain the experimental results referred to above by assuming that the stimulus to proliferation both of the original cell and its descendants may be supplied by the secretion of some virus within the cell, or immediately in its neighborhood. Such stimulus would, in all probability, lead to cell division associated with an increased capacity for food absorption along the lines depicted by Ehrlich, but rather as effect than cause. Our experiments would indicate that immunity is conferred as a result of active growth followed by recovery, some antibody being produced in the serum antagonistic either to the cell development, or more probably to that of the agent stimulating the growth of the cancer cell.

Evidence in support of the theory that some virus acting as a stimulating agent either on epithelial or connective tissue cells

leads indirectly to the formation of carcinoma or sarcoma, and that immunity against cancer is the result of a reaction against such a virus on the part of the body, is afforded by the following observations:

1. Ehrlich finds that a mouse which, through inoculation, has become immune to carcinoma is also immune to sarcoma and vice versa, thus indicating a reaction against some common agent. Ehrlich assumes the existence of a specific *Wuchsstoff* or *x* body, which, when attached to an epithelial cell, gives it the character of carcinoma, and when attached to a connective cell, that of sarcoma, and he evidently looks upon this body as an agent capable of stimulating the ordinary receptors of the cell in question, giving them an increased affinity for the assimilation of foodstuffs; but might not the stimulus in question be equally well attributed to the action of some common virus capable of infecting cells of either type?

2. Hemorrhage is apparently very frequently associated with retrogression of tumors. Any treatment tending to bring about hemorrhage retards the development of tumors, and as Ehrlich has pointed out, those tumors which were originally hemorrhagic, show the least tendency to produce tumors when transplanted, indicating that the presence of blood serum is anything but favorable to tumor development, attributable in all probability to the presence of antibodies.

3. The serums of animals which have recovered from tumors exert an inhibiting effect both on tumors in other animals and also on macerated cancer material previous to inoculation — a fact which can scarcely be explained by other means than the assumption of antibodies directly antagonistic to the development of the cells, and since the test tube experiments carried out in this laboratory would indicate that the serum in question is not possessed of any marked hemolytic or cytolytic characteristics, it would appear probable that the effect is exerted directly upon some virus within the cell, and not upon the cell itself.

4. The following observations made both by Ehrlich and ourselves:

A. That large metastases occur very seldom until near the close of the animal's life.

B. That if mice already developing tumors are inoculated for a second time from five to ten days after the first inoculation, even with a more virulent material than on the first occasion, tumors are practically never produced, and, even if produced, develop far more slowly than in normal control animals.

If, as Ehrlich believes, virulence is simply dependent upon the relative ability of the cell receptors to attach foodstuffs, the establishment of equilibrium should certainly permit of the development of the second tumor, since the receptors of the latter are supposed to be more active than are those of the normal body cells, and either equal to or more virulent than are those of the first tumor. Ehrlich explains this phenomenon by assuming that the original tumor, being well established and having a good blood supply, grasps all available foodstuffs for itself, thus depriving the cells injected on the second occasion of the necessary nourishment. Since, however, the whole question, according to Ehrlich, resolves itself into one of the establishment of chemical equilibrium between the active food receptors of a series of cells and the available supply of foodstuffs, the cells of the second tumor should at least be able to overcome the weak affinities of the normal body cells, and there is every reason to anticipate that they should develop; but, as stated above, this is practically never the case, and at autopsy merely the smallest residue of connective tissue is usually to be found at the point of inoculation. It is, however, possible that immune forces are induced in the serum, as a result of reaction against the developing tumor, powerful enough to affect the virus within the isolated cells introduced on the second occasion, but not sufficiently powerful to penetrate and destroy completely the original well-established tumor.

Further support of this point of view is found in the fact which we have frequently observed, that considerable quantities of tumor material must be employed on inoculation if the maximum yield is to be obtained, indicating the existence of immune bodies even in the serum of normal mice, which, when distributed over a large number of cells, are incapable of producing as great an effect as would be the case were the smaller amount of tumor material employed.

That immune forces are produced in the serum in gradually increasing quantities as the tumor progresses, is indicated by the tendency frequently exhibited by tumors to remain stationary after fairly rapid development, and then subsequently either to grow rapidly once more or to retrogress. In this connection it must be noted that X-rays produce a much more marked effect at this stage than at a subsequent stage, at which apparently the tumor has quite overcome the natural immunity of the mouse and is developing rapidly.

5. Perhaps the best evidence in favor of the theory of a stimulating virus is afforded by the following experiment published from this laboratory, July, 1905, as follows:

> A group of upwards of 50 mice were inoculated with an exceptionally weak strain of the Jensen tumor, with the result that only 1 fatal tumor was produced. A large number of abortive tumors resulted, and in one particular group, 209, in which 3 mice showed no tumor development and 3 recovered spontaneously, a subsequent inoculation with a more virulent Jensen strain gave no tumors in those which had previously recovered spontaneously from the weaker strain, whereas in the other 3 tumors made their appearance, 1 of them subsequently proving fatal. If it were a question of affinity for foodstuffs with which we had to deal, why did not tumors develop in all of the mice on the first occasion, or in those that had spontaneously recovered on reinoculation? It would appear more probable that the 3 mice that failed to show tumors on the first occasion were possessed of a weak immunity, insufficient, however, to protect them against the stronger materials on the second inoculation, whereas those 3 which developed the disease on the first occasion, and subsequently spontaneously recovered, possessed as a result an immunity which was sufficiently strong to protect them against all subsequent inoculations, even with vastly more virulent materials.

6. The great variation in the speed of development of tumors in the same series, the variation in the speed of development of the same tumor at different stages, the almost complete recovery, and subsequent fatal termination of certain tumors, and especially the influence of incubation on weak tumors, stimulating thereby to more active proliferation, appear to conform with the conception of a stimulating virus.

Ehrlich has presented one series of experiments which is certainly capable of a more ready explanation by his assumption of a specific *Wuchsstoff*. He found that a virulent mouse tumor was capable of growing for a short time in a rat, but subsequently retrograded. It was further demonstrated that such a tumor after

remaining for four or five days in a rat, could still be transplanted to a mouse but not to a normal rat, neither could the rat which had recovered be further inoculated. Ehrlich explains this by assuming that the mouse tumor introduced into the rat carries with it a certain amount of a specific *Wuchsstoff;* that it is capable of assimilating ordinary foodstuffs from the rat, but that so soon as its specific *Wuchsstoff* is exhausted it succumbs. Transplantation back to a mouse provides the cells once more with their specific *Wuchsstoff,* and enables them to develop, so that they are once more capable of transplantation in a rat for a short period of time; on the other hand, when passed from the first rat into a second rat, the absence of the *Wuchsstoff* in the rat prevents further development. He argues that since the mouse tumor is apparently still possessed of the same virulence after spending a certain time in the rat, the failure to take in the second rat is not attributable to attenuation, as would appear to be the case. It is, however, perfectly conceivable that the virus capable of stimulating mouse cells to proliferation is incapable of living in a rat — at any rate, for any length of time.

Ehrlich recognizes the existence of antibodies conferring immunity on those mice which, after the first or second inoculation with attenuated materials, prove incapable of developing tumors on subsequent inoculation.

The experiments enumerated above, when considered in conjunction with the cases of cage infection reported by Gaylord from this laboratory, offer very strong evidence in support of the theory that the cell is stimulated to proliferate by a parasite, or the toxins produced by a parasite which has infected the cell. If such a parasitic stimulus may be considered identical with Ehrlich's specific *x* body or *Wuchsstoff,* a ready explanation of the subsequent process of proliferation may be derived from Ehrlich's theory. The close correspondence in the experimental results obtained by Ehrlich and ourselves is of considerable interest in view of the fact that the materials employed were derived for the most part from entirely independent sources, and the experiments carried out under widely differing conditions. The existence of a definite immunity against cancer in mice has been demonstrated in a variety of ways, and any slight difference of opinion

regarding the theoretical interpretation of certain experimental results should only lead to renewed efforts directed toward the final solution of the problem.

SUMMARY AND CONCLUSIONS

From the above experiments, in which over 7,000 mice have been employed, it may be concluded that:—

1. Primary tumors are only transplanted with great difficulty; after the first generation the yield of tumors gradually increases until a maximum virulence is attained, which subsequently remains fairly constant for a considerable period of time.

2. Increase in virulence of a tumor strain is invariably associated with an increased rate of growth of the individual tumors.

3. The proportion of tumor mice recovering spontaneously in any series is apparently inversely proportional to the virulence and speed of development of the tumors of that series.

4. The larger the dimensions actually reached by a tumor the smaller are the chances that it will recover spontaneously.

5. Incubation of tumors possessed of a low grade of virulence, previous to injection into mice, is found to exert a stimulating effect, larger yields of tumors being obtained than in control series.

6. The resistance of tumor cells to mercuric chloride and other inorganic disinfectants is very high. It was found possible, for example, to destroy the bacteria present in badly-infected tumors by means of potassium cyanide without seriously affecting the virulence of the tumor on subsequent transplantation.

7. The chemical analysis of over 300 tumors shows a relatively high potassium and nucleo-proteid content, associated with high virulence and rapid development, and a low potassium and high calcium content, associated with low virulence and relatively slow development.

8. The principal evidence of the existence of immunity against cancer is as follows: Spontaneous recovery of mice from true tumors actually occurs. Those mice which have recovered are not reinoculable with tumor materials possessed of the same degree of virulence as that previously employed, and exhibit in

addition a considerable immunity to subsequent injections of far more virulent strains. The reinoculation of mice which have failed to develop fatal tumors shows in our experience a great reduction in the proportion of tumors, and inoculation for a third time has so far failed to be productive of a single tumor. The serum of recovered mice apparently exerts a definite though slight effect on the small tumors in other mice when directly injected, and also on tumor materials when admixed previous to inoculation. Mice on which tumors are already developing are, with a few exceptions, immune to subsequent inoculation, even with a more virulent tumor, indicating the production of immune forces in the serum antagonistic to the development of cancer.

9. The injection of tumor materials incubated at such temperatures as to render development impossible, or of tumor materials previously treated with chemicals at such a concentration as to inhibit development, fails entirely to confer immunity on the mice so treated.

10. The treatment of mice with increasing doses of nucleoproteids (extracted from the most virulent tumors) at stated intervals of time has so far failed to confer an immunity.

11. The process of immunizing mice against cancer appears to be analogous to that of vaccination against small-pox, the animals which recover from the attenuated form of the disease developing an immunity capable of protecting them in the large majority of cases against injections of a more virulent cancer strain than that originally employed.

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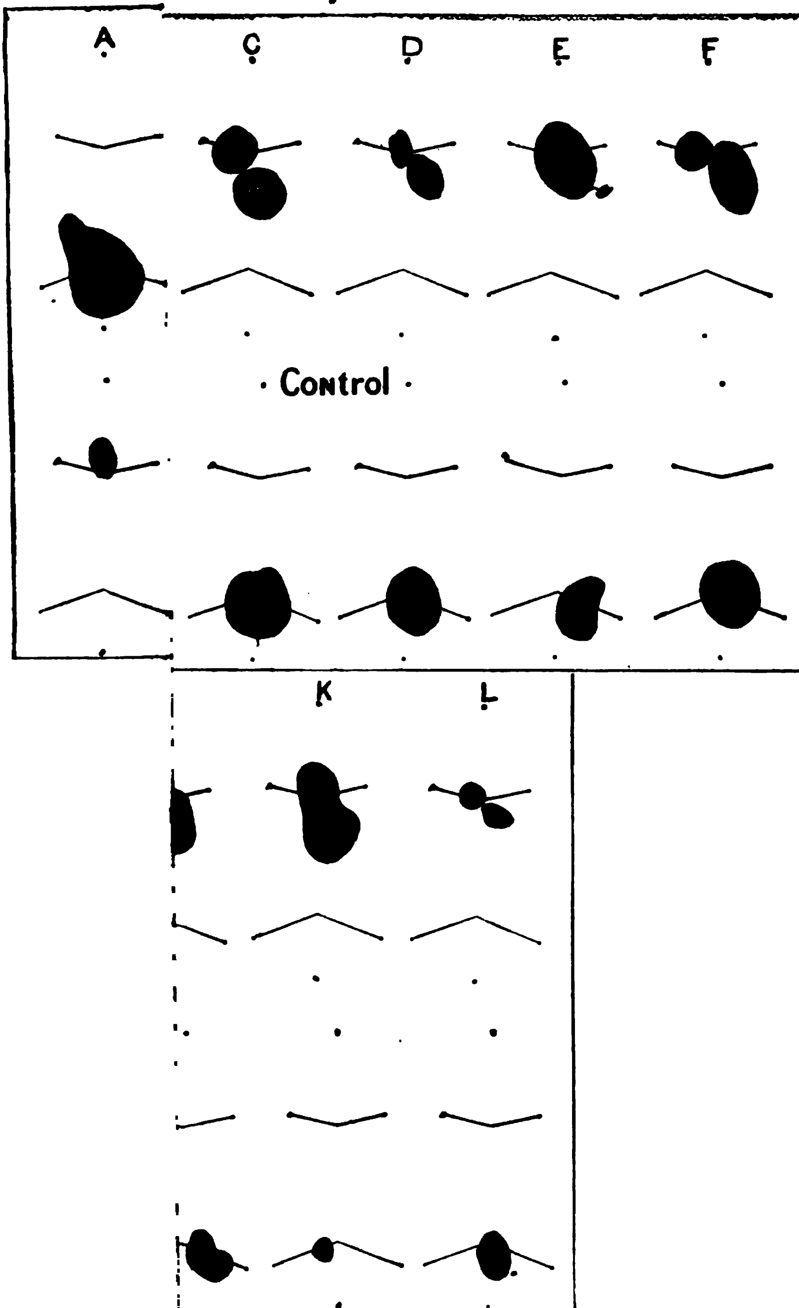
Exp II



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Parasitical Relations of Cancer

BY HARVEY R. GAYLORD, M.D.

THE belief that the cancerous process is due to some parasite has come down to us with our earliest knowledge of this affection. In the minds of the earlier observers this was due to the frequent confusion of cancer and certain of the infectious granulomata, especially tuberculosis. The clinical course of many of the sarcomata and the difficulty frequently met with in distinguishing sarcoma in its clinical aspect from such processes as Hodgkin's disease, which is undoubtedly infectious, have sufficed to keep alive, in the minds of many clinicians, the belief in the infectious nature of the malignant processes. It is obvious that a purely clinical point of view may be one-sided, but there is little doubt that many of the theories which have been advanced by pathology have not sufficiently considered the clinical aspects of the disease or else have ignored them entirely. The majority of pathologists are at present distinctly opposed to the belief that any parasite exists which could fulfil the rôle of a parasite for cancer. It is obvious that no ordinary parasite could fulfil this rôle. Therefore, when, in 1886, Scheuerlin, and later Schill, detected bacteria in cancer, it was not long before these organisms were found to be simply harmless saprophytes. This also may be stated to have been the case with the yeast organisms or blastomycetes, which have been more recently described by San Felice and others as occurring in carcinomata.

INCLUSIONS IN CANCER

Since the earliest histological investigations of cancer, there have been observed in the cells certain objects, as to the significance of which much discussion has taken place. It is not profitable to consider here the question whether or not these bodies are parasites. It is interesting to note, however, that as early as 1847 Virchow described these objects, believing them to be metamorphosed nuclei or degenerative changes, of a fatty character, in the protoplasm of the cancer cells. They were again described in 1889

by Thoma, who believed that they were protozoa; in 1890 by Sjöbring and Siegenbeck van Heukelom; in 1891 by Steinhaus; in 1892 by Soudakewitsch, Borrel, Foa, Kürsteiner, Podwyssozki, and Sawtschenko; in 1893 by Ruffer and Walker and Ruffer and Plimmer; in 1894 by J. Jackson Clarke and Cattle; in 1896 by Pianese; in 1898 by Bosc; in 1901 by E. van Leyden and Gaylord; in 1902 by Feinberg, Greenough, Nösske, and Posner; in 1903 by Apolant and Embden; and in 1904 by G. N. Calkins. Of these observers, Pianese, Greenough, Nösske, and Apolant and Embden believed that the bodies in question are not parasites. The others held them to be protozoa or allied organisms. Calkins holds that, although they have not been proven to be so, they may nevertheless be parasites. The forms in question have come to be known as "Plimmer's bodies," or Van Leyden's "bird's-eye inclusions," or the "x-bodies" of Behla. They are spherical structures, which vary in size from four to forty microns. They have a delicate limiting membrane and a central, highly refractive body. The space between the central body and the margin sometimes contains a fine protoplasmic structure, while at other times granules are regularly distributed between the periphery and the central body. They have been observed in the nucleus and in the protoplasm, and in the intranuclear forms they present an appearance not unlike the similar inclusions which have been observed in smallpox and in vaccinia. These bodies have been seen in the fresh state, but they are best demonstrated by complicated hardening and staining methods.

There is no direct proof that these bodies are parasites, although many observers have maintained the belief that they are such. On the other hand, those who have attempted to show that they are not parasites have been forced to employ the same methods of reasoning, and it can be fairly stated that to-day neither those who hold that they are of a parasitic nature nor those who hold that they are not, are in a position to prove their contention. The preponderance of opinion is opposd to the view that these bodies are of a parasitic nature, but this is, to no inconsiderable extent, due to the fact that the majority of pathologists hold, on *a priori* grounds, that cancer is under no circumstances an infectious process. There are some observers, however — notably

Borrel — who hold that cancer is an infectious process, that these inclusions are not parasites, but that there is an infective agent in cancer which is either undemonstrable or ultra-microscopic. Perhaps the best arguments in favor of the inclusions being parasites are these: Their similarity in appearance to a known organism — Plasmodiophora brassicæ — and the fact that in certain respects they resemble certain forms of the smallpox organism.

Cancer and the Acute Exanthemata

Although at first thought there would scarcely appear to be any relation between the cancerous process and the acute exanthemata, yet this analogy between the two groups of diseases has been strongly advocated, principally by Bosc, Gaylord, Borrel, and von Wasielewski; the first two observers basing their advocacy on the ground of the similarity of some the inclusions in the two processes, and Borrel and von Wasielewski on more general grounds.

It will perhaps be of interest to follow more closely the relation which exists between the two processes. Those who discovered a resemblance between the inclusions found in cancer and those observed in smallpox and vaccinia were the first to call attention to the analogy between the two processes. It was Gorini, namely, who first detected points of similarity between certain larger forms of the vaccine body as they appeared in the inoculated corneas of rabbits and the cell inclusions of cancer. This similarity applies only to certain larger forms of the vaccine body which had been previously described by L. Pfeiffer, Guarnieri, and Clarke; but Gorini was able to trace a gradual transition between the larger typical vaccine bodies and these larger inclusions, which resemble the inclusions in cancer. In 1900 the writer observed a similarity between certain of the cancer inclusions and certain forms of the vaccine organism, and from this observation it was inferred by him that if the inclusions in vaccine were parasites, then in all probability the inclusions in cancer were of the same nature. On the same day of the same year Bosc published an article in which he advanced exactly the same idea. At the same time he called attention to the fact that in the lesions of sheep-pox also there were bodies which bore a close resemblance to some of the cancer in-

clusions. Sheep-pox is characterized by the development of both epithelial and connective-tissue nodules in the subcutaneous tissue. Bosc found, in the exudate from fresh pustules, characteristic epithelial cells containing highly refractive bodies surrounded by a clear zone of protoplasm; in other words, inclusions closely resembling those described in the epithelial cells of cancer. Similar inclusions were found in the cells forming the connective-tissue nodules. A sheep's cornea inoculated with the virus of sheep-pox presented lesions very similar to those resulting from the inoculations of the rabbit's cornea with vaccine, and Bosc believed that sheep-pox presented an infection lying midway between the malignant epithelial processes and the infectious exanthemata. It is unnecessary to state that the parasitic nature of these inclusions cannot be proved by histological methods alone; and the experiments thus far made with cancer have failed to bring any proof of its specific qualities. On the other hand, the work of Councilman and Calkins and of Bosc and Howard has again brought the significance of the vaccine and variola inclusions into the foreground, and it must be recognized that if these last inclusions — which are apparently incapable of cultivation and which are demonstrated by methods similar to those employed in the case of cancer inclusions, but which present more specific characteristics than do the latter — are ultimately shown to be parasites, then there is a prospect that future investigation may show that the inclusions found in cancer are also of the same nature.

Arguments in favor of the parasitic factor in cancer can, however, be adduced without the aid of these inclusions.

GENERAL ARGUMENTS IN FAVOR OF THE INFECTIOUS NATURE OF CANCER

Transplantation Experiments

Experimental methods in cancer research have opened a new era. This has been made possible by the discovery of the transplantability of tumors in animals of the same species, the first extensive demonstration of which we owe to Hanau, who succeeded in transplanting to the third generation a carcinoma of the rat. Before Hanau, however, as early as 1875, Nowinsky succeeded in transplanting a medullary carcinoma taken from the nose of a dog,

successfully in two out of forty-two inoculated dogs. Wehr in 1883 succeeded in transplanting a medullary carcinoma from the vaginal mucosa of a bitch into a number of dogs. Most of these tumors retrograded, but in one animal the tumors grew to considerable size and produced metastases in the adjacent lymph nodes. Following Hanau, Morau in France, Leo Loeb in America, Jensen in Copenhagen, Borrel in Paris, Ehrlich in Frankfurt, Bashford in London, and the New York State Cancer Laboratory in Buffalo have all experimented with the transplantation of primary tumors — mostly in mice, Loeb's first observations being on a sarcoma of the rat. The extent to which this work is now being carried on can be appreciated when it is stated that one tumor alone, that of Jensen, is now being worked upon in at least seven laboratories, and that this tumor has been transplanted to somewhere near the eightieth generation.

The attention which has been attracted to the occurrence of primary tumors in mice has led to the discovery of a large number. Thus Ehrlich has succeeded in collecting tumors in 154 white and 10 gray mice; Bashford collected 9; Loeb has recently detected a spontaneous tumor in a mouse; and the New York State Laboratory is in possession of 8 primary tumors. Borrel has secured in Paris 30 examples of spontaneous tumors in mice, and Haaland speaks of 62 cases known to the authorities of the Pasteur Institute. The latter authority calls attention to the fact that the 62 spontaneous tumors observed in Paris were all in elderly females, and that all of the tumors were adenocarcinomata, involving the abdominal aspect, the axillæ, the groins, or the neighborhood of the anus or the vulva of these mice. They were all derived from the breast. Ehrlich likewise calls attention to the fact that, of 164 spontaneous tumors observed in his laboratory, all occurred in aged females and were all positively derived from the mamma. Eight out of nine of Bashford's mice were elderly females, and the tumors were likewise all derived from the breast; in the one exceptional case — that of a male — the tumor was situated near the root of the tail and presented the same characteristics as the other tumors. Of the eight tumors observed in Buffalo, seven were in females, the sex of the eighth having been unfortunately overlooked. They all presented characteristics similar to those observed

in the recognized adenocarcinomata derived from the breast in the mouse.

The fact that all of these tumors were derived from the breast, and the further fact that the mouse appears to be much more frequently affected by carcinoma than are other small animals, can only be explained, as Ehrlich has pointed out, by the facts that all of these mice were obtained from dealers who were engaged in raising white mice for the market and that all the females are employed for breeding purposes. The fact that almost all of the tumors have appeared in elderly females certainly points to the probability that the tremendous demands made upon the mammary tissue of these animals explain the almost exclusive appearance of this form of the tumor. In connection with these facts, the observation of Borrel that healthy mice, when kept for a sufficient period of time in the same cage with infected mice, may develop spontaneous tumors, is of the greatest importance. It has likewise been observed that wherever one spontaneous tumor developed in any particular locality where the mice are being bred, either simultaneously or later, mice with similar tumors have been found.

COMMUNICABILTY OF CANCERS IN MICE

The most striking example of the endemic occurrence of cancer is described by Borrel, who, in the course of two years, observed in one breeding place twenty cases of carcinoma of the breast. All of these mice had, at one time or another, been in the same cage. He observed further, in a second case, in the course of one year, five or six cancer mice, all of which developed in one cage. A similar endemic occurrence of cancer in the rat was observed by Hanau, who first successfully transplanted cancer in this animal. He observed in the course of six years three cases of squamous epithelioma of the vulva. There were in all about one hundred rats, all the offspring of two pairs. Perhaps the most striking evidence of cage infection is found in an observation recently made in the State Cancer Laboratory, combined with a previous observation made by Leo Loeb. Loeb states that in January, 1900, there developed in a group of cages containing rats in the Chicago Polyclinic Laboratory a spontaneous sarcoma of the thyroid. In November of 1901 a second case of sarcoma of the thyroid de-

veloped in the same group of cages, and in the autumn of 1903 a third case. The rats had been moved about from cage to cage and were all the offspring of a certain limited number of rats. The tumors presented identical histological characteristics. The first and second rat tumors were used for transplantation, in both cases successfully. On transplantation the tumor presented the characteristics of spindle-celled sarcoma, which in many animals produces characteristic regional and organal metastases. Sections of this tumor have been repeatedly shown at scientific meetings, and there is absolutely no question as to its being a genuine spindle-celled sarcoma. The spring and summer of 1902 were spent by Dr. Loeb at the State Cancer Laboratory in Buffalo. He was provided, for the accommodation of his animals, with two large and a number of small cages. He brought with him a number of rats which had been inoculated from his second sarcoma of the thyroid obtained in Chicago. During the period of his stay in Buffalo he carried out a number of successful transplantations. On leaving the laboratory in September he took with him a number of rats with tumors, but these became infected, and later the tumor was so infected as to be no longer transplantable. After Dr. Loeb's departure all rats were removed from the laboratory. The smaller cages were sterilized in the hot-air sterilizer, but the two larger cages which he had employed, being too large for such sterilization, were simply cleaned and put away. For a period of several months after Dr. Loeb's departure there were no rats of any kind in the laboratory. In the summer of 1903 some rats were purchased in Buffalo for other purposes than tumor transplantation, and a number of them were placed in the two large cages mentioned. In the spring of 1904 there was found in one of these cages a rat with a tumor the size of a horse-chestnut in the subcutaneous tissue of the right abdominal aspect. This tumor was removed by operation, and proved to be a fibro-sarcoma. It was transplanted to other rats, but without success. The occurrence of the development of this sarcoma in the rat was noted and the cage was marked. There were then introduced into the cage a number of adult rats, but, owing to an epidemic of itch among them, it was found necessary to remove the cages containing them to the base-

ment to prevent the possible spread of this infection to the hundreds of mice which occupied the regular animal space in the laboratory. During the summer of 1905 there were found in this cage two adult rats, both males, one with a large fibro-sarcoma in the right abdominal aspect and the other with a large sarcoma of the thyroid. The latter rat died early in October. Sections of the tumor showed it to be identical in appearance with the three primary sarcomas of the thyroid described by Loeb, which developed in the cages in the Chicago Polyclinic Laboratory. In the middle of October an operation was performed upon the other rat. Sections showed that the tumor was a fibro-sarcoma of identical appearance with the one which had appeared in the cage a year before. A number of rats had died during the course of the summer with tuberculosis, so that at the time of the development of the tumors there were but four adult rats in the cage, the two with the tumors and two without. No other tumors have developed in rats in any of the other cages in the laboratory, although the small cages employed by Dr. Loeb and subsequently sterilized have now had rats in them for a period of two years. Aside from the three cases of primary sarcoma of the thyroid developed in Chicago and described by Dr. Loeb, during the period of three years since his departure from the laboratory with his inoculated rats no other author has described sarcoma of the thyroid in the rat, and none has been known to develop in any of the establishments in which these animals are bred. The demand for animals with tumors has become so great that all breeders of white mice and white rats are now on the lookout for tumors, so that the possibility of their having been overlooked is reasonably remote.

Haaland calls attention to a case in which a woman in Paris purchased two white mice for breeding purposes. In the course of two years she sold about two hundred young offspring, reserving the mature mice for breeding purposes. Among these she observed twenty spontaneous tumors. The last three of these mice, with the cage in which they had developed their tumors, were brought to the Pasteur Institute. The mice were removed from the cage and were placed in a new cage, and into the cage in which they had

developed their tumors were placed new mice. None of the mice which had previously been in the cage in which the tumor developed, or the new mice which had been placed in it, developed tumors under subsequent observation. The three mice, however, which had already developed sporadic tumors were placed in a new cage, and in this cage were placed with them a number of mice derived from healthy stock, their ancestors so far as known never having had sporadic tumors. Of the healthy mice thus placed in contact with the mice already infected, four developed spontaneous tumors. From this it would appear that to a certain extent these mouse tumors are contagious. If this be admitted, what is the significance of the almost exclusive development of primary carcinoma of the mamma in elderly females among these mice? Ehrlich points out that two explanations are possible. First of all, by reason of the great fertility of the animals the older females are almost constantly carrying and nursing young. It is therefore reasonable to assume that the tremendous demands made upon the breast predispose to an unlimited proliferation of the epithelium of that gland. On the other hand, it is probable that, through the indiscriminate nursing of the young, first by one mother and then by another, an infection of the breast in one mouse might easily be transferred to that of another mouse. It has been shown that in the early stages of carcinoma the breast still possesses the power of lactation, and it is therefore perfectly possible that, through eversion of the nipple, the virus may be transferred from that structure in one animal to the corresponding structure of another. Both in Paris and in Ehrlich's laboratory careful experimentation is being carried on for the purpose of ascertaining whether or not this occurrence can be experimentally proven. In the light of Borrel's observation — viz., that healthy mice which are brought in contact with infected mice can acquire these tumors — it would seem that the exclusive appearance of tumors of the breast among animals used solely for breeding purposes presents very suggestive evidence in favor of an infectious factor.

TRANSFERENCE OF THE INFECTIOUS FACTOR IN CANCER CELLS TO NORMAL EPITHELIUM

The evidence thus far adduced applies only to primary tumors. If there is a contagious factor which can be transferred from one animal to another, bringing about the transformation of normal epithelial cells into cancer cells, then it is not improbable that, in the very beginning of cancer, this contagious factor may be transferred for a limited period from one cell to the next. In fact, pathologists generally recognize that, in small, beginning carcinomata, such a transformation can be observed. We have from Orth, in his most recent utterance on this subject, the following: "I am, I confess, of the opinion that there are cancers in which the transformation of preformed epithelial cells into cancer cells takes place continuously in the tissue bordering upon the margin of primary tumors; also that there are multicentric cancers, not only in the sense that the cancer change takes place at the same time in different neighboring spots, but also in such a manner that one spot becomes cancerous later than another." If a primary cancer starts from a given centre and the cancerous transformation spreads from cell to cell, it must be that that force or factor which endows normal epithelium with the power of limitless proliferation is transferred, at least for a certain period of time, from the involved cells to the adjoining normal ones. Although this appears to be the case in the period of the inception of a cancer, experimentation has shown that the cancer cell, once endowed with this power of proliferation, retains it most persistently, and a transference of this power to other cells never occurs, unless one or two suggestive observations, which will be referred to later, are evidences of such transference.

Success in transplanting these sporadic tumors in the mice has been variable, but the general experience tends toward more successes as the work progresses. In six of the mice in which cancer was transplanted by Bashford, there were only two in which the disease persisted beyond the second generation. Borrel is in possession of an epithelioma and an adenocarcinoma which are transplantable, and Ehrlich has at present ten different sporadic tumors in process of transplantation, some as advanced as the sixtieth gen-

eration. Bashford has had over three thousand transplanted tumors under observation. Ehrlich's, Borrel's, and Jensen's observations must likewise run into high figures, and the New York State Laboratory has already had about six hundred. It will thus be seen that the last two years have been very fruitful in experience in the investigation of cancer, and it may be said that, although the work has just begun, many ideas which we have held regarding this process have been shown to be erroneous, and many characteristics have developed which were entirely unexpected.

CHARACTERISTICS OF TRANSPLANTABLE MOUSE TUMORS

It must be pointed out that the mere transplantability of cancer throws no light upon the mechanism by which spontaneous tumors develop. These transplantations are modifications of the process of metastasis. The success with which they have been accompanied has shown great variability, but on the whole the experiences of all laboratories have been that tumors which have been often transplanted acquire an increased virulence, so that, although the success attending the first attempts at transplantation has in many cases been as low as one or two per cent., in later cases the virulence has risen to such an extent that the average has been as high as from eighty to one hundred per cent. A most interesting example of the tremendous virulence of these transplanted tumors is found in one which is under observation by Ehrlich. This, known as No. 7 in his series, presents a virulence which is most astonishing. The transplantations with this tumor material have for a considerable period of time given from eighty to one hundred per cent. of successes. The transplanted tumor grows with such rapidity that in eight days after inoculation it has been found to weigh 2 gm.; at the end of two weeks, over 3 gm.; and at the end of three weeks, usually 5 gm. Tumors as large as the mouse itself not infrequently develop within two months from the time of inoculation. All laboratories which have been working on transplantation have had similar experiences. Some tumors are found to grow very slowly, as did that of Morau, which required months for its full development, whereas others present the characteristics of the tumor described above. In all tumors, however,

repeated transplantation, instead of weakening the energy of the tumor, seems to increase its virulence, and it is now recognized that the most distinguishing feature of cancer is the unlimited power of proliferation which the cancer cells possess, this power having already carried some tumors beyond the sixtieth generation of transplantation through healthy mice.

All this experimentation has failed to show us how the cancer cells acquire this phenomenal power of proliferation. That the characteristic factor of cancer is found only in the epithelium is shown by the fact that the stroma in the transplanted tumors is furnished by the host. That this factor, in the course of transplantation of mouse tumors, is occasionally transferred to the connective-tissue elements of the stroma, endowing them with sarcomatous characteristics by which the tumor is transformed into a mixed tumor, is shown by the fascinating publications of Ehrlich and Apolant (*Berl. klin. Wochenschr.,* 1905, No. 28, and 1906, No. 2). These observers have now encountered this phenomenon in three tumors. In the first case observed, the tumor presented the usual characteristics of the adeno-carcinoma of the mouse and had been transplanted without any change to the sixth generation. The tumor consisted of nests of varying sizes of alveolar arrangement, with a not very well developed connective-tissue stroma. Between the sixth and ninth generations the tumor underwent a change in which the carcinoma suddenly presented the characteristics of a mixed tumor, the thin connective-tissue stroma presenting every evidence of active proliferation; wide avenues of closely packed, deeply staining spindle cells, with abundant karyokinetic figures, appearing between the nests of epithelium. These characteristics persisted from the ninth to the thirteenth generation, the epithelial characteristics gradually diminishing and the nests becoming smaller and more widely separated; and in the fourteenth generation the epithelium had entirely disappeared from the tumor, leaving a spindle-celled sarcoma, which is still being transplanted and has reached the fortieth generation. The accompanying table from Ehrlich will serve more graphically to emphasize this remarkable observation:

Family 16 Carcinoma

1 Generation Carcinoma
2 Generation Carcinoma

6 Carcinoma

9

Mixed tumor 10b

10a Mixed tumor

11

12a

13a Sarcoma

12b

13b Mixed

14 Sarcoma

15 Sarcoma

13c Mixed

12c Mixed

The generations marked a, b, c descended from various mice of the preceding series.

Recently Apolant and Ehrlich have reported two further similar observations. In one of these the sarcomatous transformation developed in an adeno-carcinoma which was provided by mixing together various adeno-carcinomata which were respectively in the twenty-first, the thirty-third, the twenty-third, and the nineteenth generations of transplantations. One of the strains derived by this mixture, between the twelfth and fourteenth generations, showed a marked increase in the proliferation of the connective-tissue stroma, which awakened at once the suspicion that the development of sarcoma was taking place. In the sixteenth generation this was so far developed that the tumor presented the characteristics of a mixed tumor. In contrast to the first case reported, the differentiation between the nests of epithelial cells and the proliferating stroma was not nearly so marked as in the preceding case. The sarcoma cells likewise were more polymorphous in appearance, typical

spindle cells forming only a part of the tumor. They lay in irregular masses that filled the spaces not occupied by the net-like structure of the epithelial portion of the tumor. The proliferative characteristics of the sarcomatous portion of the tumor were not nearly so marked as in the first case. The tumor at present is in its tenth generation of transplantation, and the proliferation of the connective-tissue and epithelial elements appears to be about on the same footing as it was before, the tumor having during the last six months shown but slight changes in the relative proportion of epithelium and connective-tissue. The rapidity of growth of this tumor shows no diminution, the authors having observed tumors of enormous size, in many cases equal to that of the mouse itself.

The third observation is the most striking of all. It occurred in the course of transplantation of Ehrlich's tumor No. 7, which is the most virulent of all mouse tumors yet under observation. This tumor had shown, from the fortieth to the sixty-eighth generation, a marked increase in the connective-tissue without the stroma presenting the characteristics of a sarcoma, when suddenly in the sixty-eighth generation it took on a marked sarcomatous appearance, associated with such colossal proliferation that in the next generation many of the tumors were sarcomas without any evidence of epithelioma. Here and there some of the transplanted tumors contained a few nests of epithelium. These remnants of carcinomatous epithelium have been detected as late as the seventy-first generation. The sarcoma cells in this tumor were likewise more polymorphous in character, those of a spindle shape being in a minority. This tumor has now been transplanted three generations further without any loss of the colossal proliferative qualities with which it has been endowed from the first. The explanation of this phenomenon given by Ehrlich is that some form of stimulus present in the carcinoma cells is in certain phases of its development transferred from the epithelium to the connective-tissue stroma of the tumor and transforms the connective-tissue cells of this structure into typical sarcoma cells capable of probably indefinite transplantation.

It is impossible to draw conclusions from a single observation, but the phenomenon described above may possibly be explained

by the assumption that the chief characteristic of a cancer — viz., its power to proliferate to an unlimited extent — has, in this particular instance, been transferred from the epithelium to the connective-tissue. To assume, on the other hand, a transformation of epithelial cells into connective-tissue cells, would be contrary to all our histological knowledge. It can, of course, be said that the phenomenon under consideration represents merely the sporadic development of a sarcoma on the basis of a carcinoma. That the x-factor in cancer may possibly be transferred to other cells is shown by the frequent observations referred to by Haaland, and observed in Buffalo, of the development of primary adenomata in the lungs of mice which have been the subject of transplantation of these mammary tumors. Haaland refers to the fact that this primary development of adenomata in the lungs of mice is a not uncommon occurrence, and our own observations corroborate this statement.

Natural Immunity to Implantation in Mice

It has been found in all laboratories that a certain proportion of mice cannot be inoculated with the tumor. Thus far, a natural immunity against these inoculation experiments appears to bear no definite relation to heredity, but in all laboratories mice have been found which appear to be permanently immune, and these mice have frequently been the offspring of parents both of which were afterward successfully inoculated and died of the tumors.

Spontaneous Retrogression in Cancer of the Mouse

Although the disease, once established by implantation, is in a very large per cent. of the cases fatal, in all laboratories occasionally spontaneous cures have occurred. These have been observed in Erhlich's laboratory and also by Bashford; and apparently, up to the present time, the greatest number have occurred in the Jensen mice under observation in the State Laboratory in Buffalo. Immediately following the transplantation of these tumors — which is done by taking uncontaminated tumor, mixing it in a mortar with three or four parts of normal salt solution, and injecting it beneath the skin of the back through a coarse needle with a syringe or introducing particles through a small trocar — there is frequently a slight reaction, which subsides on the second

or third day. It is obvious that in many of these experiments transient infection occurs, as shown by the formation of an abscess. This usually interrupts the experiments but occasionally the swelling subsides and ultimately a tumor develops.

In the period from February to June, 1905, not less than twenty per cent. of the tumors resulting from successful inoculation underwent spontaneous retrogression. This is a higher percentage of spontaneous recoveries than has yet been reported from any other laboratory. The distribution of the period in which the processes of retrogression were apparent shows that more spontaneous retrogressions occurred early in the process than late. There are, however, a certain number of retrogressions which occurred in what would normally be the last stages of the disease. One of the most striking examples occurred in a rapidly growing tumor, which reached a weight of over 3 gm. in forty-three days after the inoculation, then began to retrograde and ultimately disappeared.

That a spontaneous cure of a genuine carcinoma in the mouse should occur and should be well authenticated would at first seem surprising, but a careful review of the literature has shown that undoubted cases of spontaneous cure have also been observed in human beings. It is natural that a greater percentage of these cures should occur under experimental conditions than under the conditions in which we encounter cancer at the bedside. Mice used for experimentation are taken at random, and it is obvious that some of them have a greater resisting power than others, as shown by the fact that a certain percentage of them possess a natural immunity which protects them from being successfully inoculated. The cases which we meet clinically are those of individuals who apparently have no sufficient immunity, and we see therefore only the unfavorable cases. It is not improbable, however, that even in human beings patients become infected with cancer, but make early spontaneous recoveries, perhaps without attracting even their own attention.

EVIDENCE OF AN ACQUIRED IMMUNITY AGAINST CANCER IN MICE

Researches in the State Laboratory as to the nature of the phenomena associated with spontaneous cure point very strongly

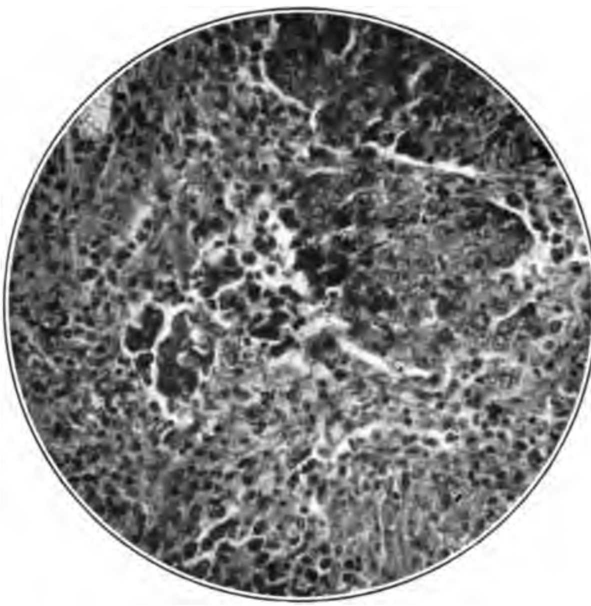

FIG. 1.—MICROPHOTOGRAPH. x-260. EPITHELIUM AT MARGIN OF TUMOR UNDERGOING RETROGRESSION FROM X-RAY TREATMENT.

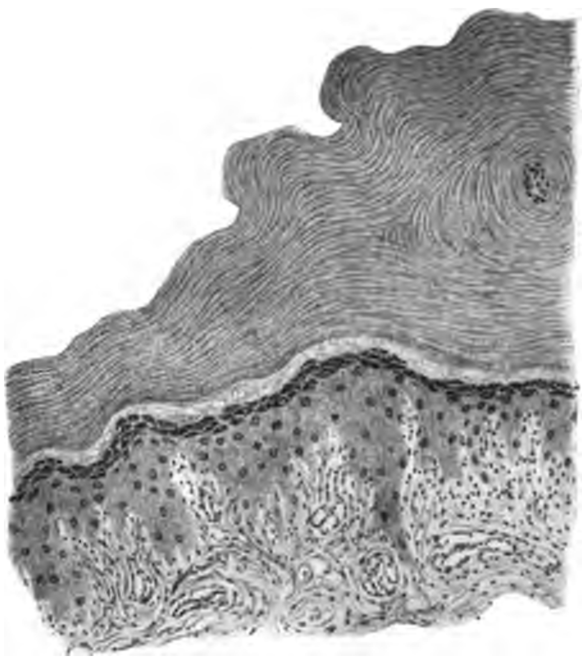

FIG. 2.— SECTION OF WART THIRTEEN DAYS AFTER FIRST TREATMENT, NINE DAYS AFTER LAST TREATMENT WITH X-RAY, SHOWING COMPLETE HORNIFICATION OF EPITHELIUM OF WART AND NEW SKIN FORMED FROM DEEPER LAYERS. (*Perthes.*)

toward the presence, in mice which have recovered spontaneously, of a form of acquired immunity. This is shown by the failure successfully to reinoculate any mouse which has spontaneously recovered. The immune factor is apparently present in the blood, and in some mice has been sufficiently active, when injected into other mice with growing tumors, to influence the growth of the tumor. In this way small tumors have been made to retrograde and large tumors have been inhibited in their growth. Further proof of the presence of an immune factor in the blood of mice is found in the recent observations of Clowes, which show that when cancer material is treated with a sufficient proportion of the blood of spontaneously recovered mice the number of successful inoculations is markedly reduced.

HISTOLOGICAL CHARACTERISTICS OF RETROGRADING MOUSE TUMORS

Examinations of the histological appearance of tumors undergoing spontaneous retrogression, and of those retrograding under the influence of injections with immune serum, show identically the same picture. If the action of this serum were cytolytic in its nature, we should expect to find evidences of destruction or direct injury to the cells, but this is not the case. About the margins of retrograding tumors one finds that the cells have undergone simple atrophy, and that where groups of cells remain they frequently coalesce into pseudo-giant cells. These are surrounded by connective tissue, and ultimately, through the process of atrophy, disappear. In tumors undergoing retrogression hemorrhage is a frequent occurrence. An examination of the cancer cells immediately adjacent to the hemorrhages in the tumor shows that this process of simple atrophy is most marked where the cells have come in contact with the extravasated blood. Practically, one can see here the direct action of the blood upon the cells. There is no necrosis of the protoplasm, and karyokinetic figures can be found in the epithelial cells until the very last. The picture presented shows that the epithelial cells are subjected to a process which is identical with that which overtakes transplanted or misplaced normal epithelium. Leo Loeb and others have shown that if fœtal epithelium is aseptically transplanted into

the subcutaneous tissues in adult animals, it is able to maintain itself for a period of time during which its dynamic force suffices for proliferation to the sixth or seventh generation, after which the force is expended, the cells undergoing atrophy and becoming surrounded by connective tissue, which grows between them. The picture presented here is exactly like that found in these retrograding tumors.

From this observation it must seem obvious that in spontaneously retrograding tumors the immune factor, instead of working directly upon the cells, reduces them to the status of normal epithelium, and they are then removed by a process of atrophy and repair which is identical with that which overtakes misplaced normal epithelial elements. Becher, Peterson, and Schwartz have shown that similar reparative processes are frequently at work in many human carcinomata. That the connective-tissue activity is secondary is shown by inference with the immune mechanism, which inference can be brought about by bleeding. In the New York State Laboratory it has been found that in the case of tumors which were undergoing retrogression as the result of injections of immune sera, severely bleeding the mouse would interrupt the process and the tumor would thereupon begin to grow as rapidly as ever. This observation, in connection with the facts which tend to show that the immune factor is in the blood, strongly indicates that the proliferation of the connective tissue is but a secondary process, which only becomes active when the cancer cells are reduced to the status of normal epithelium.

IDENTITY OF HISTOLOGICAL CHARACTERISTICS OF SPONTANEOUSLY RETROGRADING TUMORS AND TUMORS RETROGRADING THROUGH TREATMENT WITH IMMUNE SERA, THE X-RAY, OR RADIUM.

The changes which are brought about in carcinoma, either in man or in animals, by exposing them to the activities of the *x*-ray or of radium, have been shown by Exner, Perthes, and others in man, and by Apolant and Embden and Bashford in mice, to present exactly the same histological picture as that which is presented by tumors undergoing spontaneous retrogression. This fact has been under observation for over a year in Buffalo. A section of a tumor retrograding under the activity of the *x*-ray or of

Fig. 3.— Section of Untreated Wart for Comparison. (*Perthes.*)

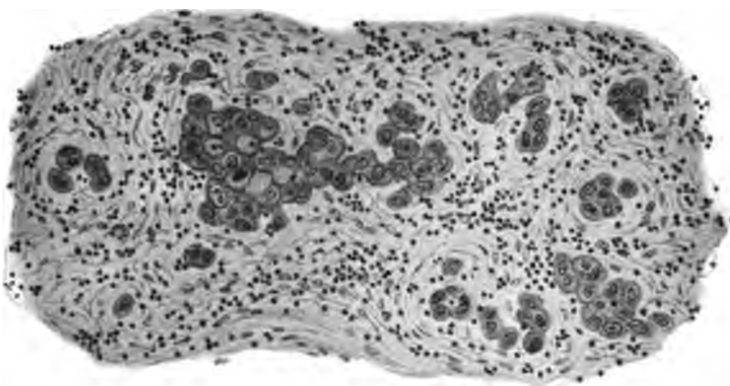

FIG. 4.— HUMAN TUMOR UNDERGOING RETROGRESSION FROM TREATMENT WITH X-RAY. (*After Perthes.*)

radium is in no way distinguishable from one taken from a tumor undergoing spontaneous retrogression or retrogression induced by serum treatment. Examination of the blood of mice which have recovered from tumors through the activity of the x-ray shows that this fluid does not contain any acquired immune factor. If, however, in the course of treatment a mouse is heavily bled, the tumor will frequently begin to grow — a phenomenon which leads to the conclusion that the x-ray does not act directly upon the tumor, but through such immune factors as the mouse still possesses. For this reason it would appear that the x-ray and radium reduce the virulence of the tumor or so injure the x-factor that the natural immunity brings about the retrogression of the tumor. In this way it is possible to explain those tumors which are not affected by the x-ray, and also the fact — which has been frequently observed — that tumors which are being favorably affected suddenly begin to grow in spite of continued treatment.

Significance of Perthes' Experiments with the x-Ray on Warts

That the x-ray, either directly or, as would appear, indirectly, robs the epithelial cell of the factor which causes its unlimited proliferation, and leaves the normal epithelial cells unaffected, is shown by the interesting experiments on warts by Perthes. Perthes has clearly demonstrated that the dose of x-ray required in the treatment of cancer, or for the removal of warts, does not injure directly either the normal epithelium or the epithelial cells of the tumor. If the tissues surrounding the tumor are overdosed a so-called x-ray burn may be induced, but this is an injury entirely independent of the ideal therapeutic activity of the agent. Perthes has shown by sections that a wart which has been properly dosed, frequently with but one treatment, will thereupon undergo a process of retrogression, in which all of the cells forming the wart become hornified, *with the exception of those of the deeper or germinal layer; and these promptly proliferate and produce, not a new wart as before, but normal new skin to repair the defect.* If the dose is not sufficient the superficial cells will undergo hornification, the wart will be reduced in size, but the cells of the deeper layer will again proliferate and produce a new wart. *This*

proves conclusively that the x-ray does not act through any form of injury to the cells themselves. It removes from them the tendency to proliferation which produces the wart, and leaves behind, in the necessary cells of the germinal layer, normal uninjured cells which are capable of producing new and normal skin. As it is the fate of superficial epithelial cells of the skin, when their period of utility is passed, to undergo hornification, the process of hornification in the cells of the wart is probably secondary. Once their power of abnormal proliferation has been removed, they succumb to that fate for which they were normally intended, which is hornification; and this involves all of the cells of the wart except those which are destined to resume their normal functions.

CHARACTERISTICS OF THE UNKNOWN STIMULUS IN CANCER

The observations thus far accumulated on the spontaneous retrogression of tumors, the retrogression of tumors through an immune agent, and the direct or indirect activity of the x-ray and radium, tend to show that in these agents we have a means of removing from the cancer cell the x-factor. If, as conceded by Orth, there takes place at the margin of tumors a gradual transformation of normal epithelial cells into cancer cells, and if, by the action of immune sera and the x-ray, we can again reduce these cancer cells to the status of normal cells, it seems almost conclusively shown that there can be added to a normal epithelial cell a factor which is capable of endowing it with the power of continuous proliferation, and which can again be removed from it, leaving a normal epithelial cell. This normal epithelial cell, it is true, may be superfluous, in which case it will undergo processes of atrophy and removal the same as may take place in any other misplaced normal epithelial cell. But if, as in the case of warts, the cell still has a function to perform, it can resume its natural proliferative activity — an activity which does not overstep the bounds set by the physiological laws of normal life.

It has been suggested that the unknown factor in cancer is of a chemical nature. No less an authority than Marchand has suggested that it might be some toxin. If the facts in the case are considered, it is obvious, as Clowes has shown, that this is impos-

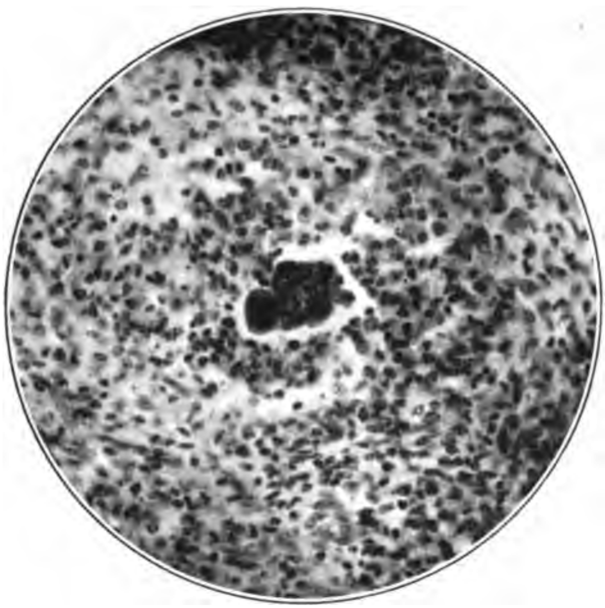

FIG. 5.—MICROPHOTOGRAPH. x-260. LAST REMNANT OF EPITHELIUM FROM A TUMOR UNDERGOING SPONTANEOUS RETROGRESSION.

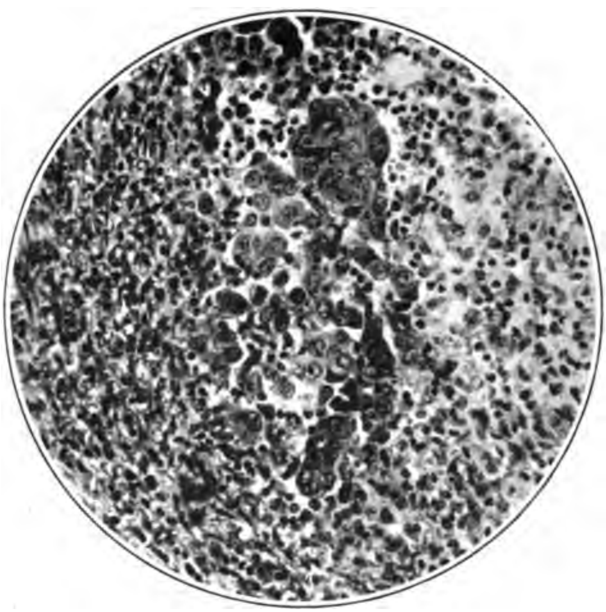

FIG. 6.— MICROPHOTOGRAPH. x-260. ALVEOLUS AT MARGIN OF TUMOR UNDERGOING RETROGRESSION FROM SERUM TREATMENT.

sible. An agent which is capable of keeping up continuous proliferation in cancer cells — which, theoretically speaking, starts with one cell and passes into its offspring through thousands of generations, during which time the number of cancer cells increases indefinitely — must, quantitatively speaking, increase in bulk. That this must be so is evidenced by the fact that this factor can be removed and must be removed from each and every cancer cell before the cell undergoes retrogression. This is shown to be the case in experimental tumors which are undergoing retrogression after treatment by the x-ray or through the activity of sera. The changes brought about by either of these agents is found to be most marked at the periphery of the tumor, and it has been found that epithelial cells taken from the centres of tumors which are retrograding at the margins can be transplanted and will produce tumors, whereas the cells at the margins present changes which show that this would be impossible. Therefore, the agent must be removed from each and every cancer cell; and as this agent, although present in the beginning in but one or two cells, later comes to occupy a bulk of cells which can scarcely be estimated, and as, furthermore, it must likewise have increased rather than have diminished in activity, it must certainly also have increased in amount. How enormous the proliferative powers of even a small mouse tumor may be is indicated by the astonishing figures which Ehrlich has published in connection with his rapidly growing tumor No. 7. He has estimated that this tumor is now growing at a rate which would permit of its being carried through sixty generations in one year. As the tumor is now giving nearly 100 per cent. of increase, he estimates that if from 12 to 15 mice were used for each transplantation, within one week 10 tumors of the size of that used for transplantation would be produced. From each of these in eight days 10 more could be produced, so that in the third generation 1,000 tumors, in the fourth 10,000 tumors, and so on, would result. If this were carried to the sixtieth generation, it would represent 10^{60} c.cm. of tumor if each tumor weighed but 1 gm. In the course of one year this would lead to a bulk of tumor which is scarcely comprehensible. It represents, according to Ehrlich, a cube the edge of which would measure 1,000,000,000,000 kilo-

metres — a distance which it would require light 105 years to traverse. In spherical form it would represent a mass with a diameter 890 times greater than that of the sun, and a volume exceeding that of the sun 7×10^{26}. If the agent which could keep pace with this tremendous increase in bulk were a toxin, it could only do so by reproducing itself; and the only possible mechanism by which this could be brought about would be by the agent acting upon the protoplasm of the new cell in such a manner as to cause it to produce its like. No chemical agent, however, with which we are acquainted, toxin or otherwise, and which is capable of bringing about a reaction in living protoplasm, causes this protoplasm to produce the same agent. On the contrary, the protoplasm produces, in all cases thus far known, an agent which is antagonistic to the first — in other words, some form of anti-body. For this reason it is impossible to conceive of any chemical agent endowed with the power to fulfil the conditions of the x-factor. We are therefore compelled to assume that the x-factor must be some agent which can reproduce itself, and thus far the only agents with which we are acquainted which can accomplish this are living agents. Hence the most rational explanation of the unknown factor in cancer is that it is some living agent. If we so wish we can speak of this agent as a virus, as does Borrel, inasmuch as we do not know its specific nature. Borrel believes that there is an infectious factor in cancer as yet undemonstrated, and that it is in all probability an invisible or ultra-microscopic organism. The same contention has been made in the case of syphilis, because the agent was unknown (unless the recent observations of Schaudinn, and of many others confirming it, should ultimately show that spirochæte pallida represents a phase of the organism of syphilis); and it is likewise held to be true in smallpox, in vaccinia, and in other diseases.

SIGNIFICANCE OF FILTRATION EXPERIMENTS

The belief that the contagious factor is invisible has usually been based upon filtration experiments. The virus of sheep-pox has been shown by Borrel to pass through the Berkefeld and the coarser grades of the Chamberland filter. This has likewise been shown to be the case with vaccine virus. The question arises as

to whether filtration experiments are necessarily an evidence of an ultra-microscopic organism. Borrel furnishes light on this point. In his filtration experiments with sheep-pox he discovered that when he diluted the virus with tap water, after four days there developed in the filtered and otherwise sterile virus a small protozoön, to which he gave the name Micromonas mesnili. The organism when in its largest form in the virus — it is of course impossible to affirm that the organism under other conditions does not possess a still larger phase — was three or four microns long and as many wide. That the organism in question had nothing to do with the virus was shown when distilled or sterilized water was used to dilute the virus. Borrel found that his organism followed the same law as the active principle of the virus; that is, it passed through the filters through which the virus passed, and was held back by filters which were proof against the passage of the virus. That the organism passed through in some practically invisible spore form, and then developed on the suitable medium of the virus, was shown by its appearance in virus only after four days and the impossibility of detecting it in filtered water in which the larger forms did not develop. Borrel was forced to conclude: "Le passage à travers un filtre n'implique pas forcément l'idée d'un microbe invisible."

It must be noted that Borrel's Micromonas shows as its largest form an organism considerably smaller than the larger inclusions of vaccine, variola, and cancer. However, to assume that because the spore of an organism is sufficiently small to pass through a certain filter, its largest form would be within a certain limit of size, is not justified by biological knowledge. Calkins has described a protozoön, Lymphosporidium truttæ, the spores of which have a diameter of one and one-half microns and divide into six sporozoites, each less than one-half a micron in diameter. Borrel likewise points out that there is an essential difference between the smaller forms of motile animate parasites and bacteria of relatively the same dimensions. The first are more plastic and accommodate themselves to the pores of the filter, passing through where bacteria are held back. In all probabiltiy the sporozoites of Lymphosporidium truttæ, less than one-half a micron in diameter, would pass through a bacteria-proof filter; and yet the largest

form of this organism is a multinuclear amœba twenty-five microns in diameter.

It will be noted that Micromonas mesnili is three to four microns long and as many wide. The spirochæte pallida in its smallest form is one-quarter of a micron in diameter and four to fourteen long. Becchi has shown that even large protozoan amœbæ, twenty-five microns in diameter, may pass readily through Berkefeld bougies, and for this reason it is desirable to eliminate filtration experiments in attempting to determine the relative size of organisms. There is a not remote similarity between the subcutaneous lesions of syphilis and some of the infectious granulomata and even sarcomata.

INFECTIOUS VENEREAL GRANULOMA OF THE DOG

In this connection Bashford has recently described the histological characteristics of an inoculable venereal granuloma found in dogs, which possesses certain characteristics of a malignant tumor, and presents still others which leave no doubt that it is an infectious process, although the virus or organism is as yet undetermined. This tumor seems to be almost a connecting link between the infectious granulomata and malignant tumors. It is common in the dog, is transmitted by coitus, and develops in the subcutaneous tissue about the genitals. The tumor cells are polygonal, with scanty granular protoplasm and large, spherical nuclei. In the resting stage they possess one large nucleolus and a delicate chromatin reticulum. Mitotic division is common in the nuclei, and, although the type is commonly bipolar, *multipolar figures* are not unusual. The tumor is divided up into lobules by delicate connective-tissue septa containing fully developed capillaries. Hemorrhages are frequently found. The general appearance closely resembles that of a round-celled sarcoma with a parenchyma arranged in alveoli. In primary tumors (see Fig. 7) Bashford shows that a transformation of the connective-tissue cells into tumor cells can be demonstrated. This is only apparent where the rapid growth of the tumor has not resulted in pressure upon the surrounding structures. One striking feature of the tumor is that, although this transformation is going on at the periphery, the greater portion of

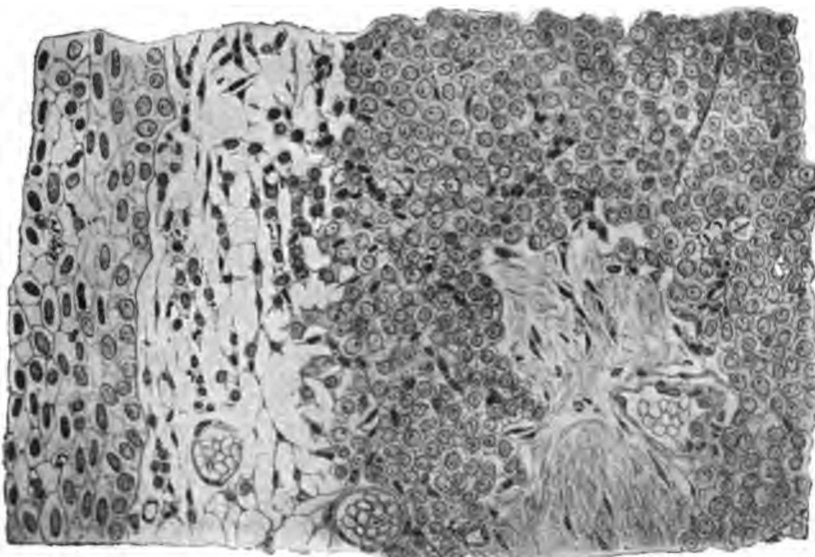

FIG. 7.— INFECTIVE VENEREAL TUMOR OF VAGINA OF DOG. PRIMARY GROWTH IN VAGINA. TRANSFORMATION OF CONNECTIVE TISSUE CORPUSCLES INTO TUMOR CELLS. x-350. (*Bashford.*)

the bulk of the tumor is brought about by proliferation of the tumor cells, in this way closely resembling the method of growth of a true malignant tumor. In the later stages the tumor grows almost entirely from its own resources. The primary lesion in this tumor is therefore in no way different from that of a primary sporadic carcinoma, in which there is likewise a transformation, at the margin, of normal cells into cancer cells. When, however, this tumor is transplanted, its true characteristics appear. According to Bashford, when the tumor cells are implanted in the subcutaneous tissues of a new host, all of the implanted cells, instead of continuing to proliferate, disintegrate, and a new tumor is formed by the action of the specific factor upon the connective-tissue cells of the host. Evidence of this process is found by Bashford at the margin of newly developing nodules after implantation. Inasmuch as Bashford believes that the implanted cells all disintegrate, it is obvious that the virus is the only factor which persists.

All attempts to determine the precise nature of this virus have thus far failed. Filtration experiments do not appear to have been carried out thus far. These tumors frequently grow to great size and sometimes undergo spontaneous retrogression. In transplantation experiments new tumors can be recognized in from eight to ten days, and subsequently they attain a diameter of several inches. Metastases may likewise develop in the mesentery after intrascrotal inoculation, and the lymph nodes adjacent to large growths are frequently enlarged. The disease cannot be transmitted to the cat, rabbit, guinea-pig, or mouse. Bashford concedes that, in its histological features, local mode of origin, partial growth from its own resources (in the later stages causing pressure on surrounding tissues and organs), and in the limitation of its transmissibility to one species, it closely resembles a malignant growth. He believes that its invariably infective history, the transformation of the surrounding connective-tissue corpuscles into tumor cells even in fully developed tumors, its artificial transmission, following the laws of such granulomata as tubercle or glanders, and the fact that it occurs naturally in animals before sexual maturity, all serve to distinguish it from true malignant tumors.

These objections, in the light of the facts already adduced, are not very convincing. On the other hand, we have shown that there is strong evidence of an infection in the primary sporadic tumors of the mouse, and we may add that many authorities concede that in primary tumors there is a transformation of normal epithelial cells into malignant epithelial cells at the margin of the tumor. Furthermore, the fact that the disease occurs naturally in young animals, which is likewise true of sarcomata, should speak rather in favor of an analogy to malignant growths, which appear oftener in old age than otherwise. The one respect in which they appear to differ essentially from malignant tumors is that the cells do not appear to possess the power of limitless proliferation. It would seem that in transplantation experiments it would be a matter of great difficulty to determine whether or not all of the implanted cells disintegrate, and the essential point in which these tumors appear to differ from malignant tumors seems to be in the transformation of the normal cells of the host, in transplanted tumors, into tumor cells. The transplanted tumor in this case appears to repeat processes which are found in the development of sporadic tumors only, and as such it would appear that this tumor should in the future be the source of much fruitful investigation. The points which it has in common with true malignant tumors, the fact of its invariable infectivity, and the undoubted presence of an infective factor, should throw much light upon the much more elusive factors in malignant tumors.

Sticker, who has carried out extensive transplantation experiments with a tumor similar to the one described by Bashford, and who has carefully compared those transplanted by Smith and Washburn, Wehr (1888), and Geissler (1895), arrives at the conclusion that Bashford's interpretation of these tumors is not correct, and that they are genuine round-celled sarcomas. In this he is supported by Albrecht, Bollinger, Duerck, von Hansemann, Kitt, Luepke, Orth, Ribbert, Schmaus, Schmorl, Schuetz, Arnold, and Weigert, all of whom examined specimens of all five tumors (Smith and Washburn, Sticker, Wehr, Geissler, and Bashford), and diagnosed them to be typical round-celled sarcoma.

SUMMARY

The following, then, are the arguments which have been adduced, from the modern research into cancer, in favor of the infectiousness of the process:

1. An analogy exists between certain of the changes in the epithelium in cancer and those occurring in the epithelium in certain of the acute exanthemata, notably variola and sheep-pox, known infectious diseases.

2. The almost exclusive appearance of cancer of the breast in elderly female mice which have been used extensively for breeding is best explained by the transference of some infective agent, through the medium of indiscriminate nursing, by offspring (Ehrlich).

3. Tumors in mice are almost never found alone. In breeding establishments, where one case appears it is always accompanied by others. Healthy mice, brought in contact with mice with primary tumors, acquire the same (Borrel).

4. The reappearance of sarcoma of the rat in a cage which had contained rats inoculated with sarcoma points to the possibility of cage infection in this form of cancer.

5. A gradual transformation of normal epithelial cells into cancer cells occurs at the margins of primary cancers (Orth).

6. The continued transplantation of mouse tumors increases rather than reduces their virulence. Certain mouse tumors under transplantation have acquired a virulence only comparable to that of an acute infectious process.

7. The transformation of an adenocarcinoma into a sarcoma (Ehrlich) is most easily explained by assuming the transference of an infective factor from the epithelium into the connective tissue of the stroma.

8. A certain number of mice are shown to possess a natural immunity which prevents inoculation with cancer. Spontaneous retrogression of cancer in mice is accompanied by histological appearances which show that the epithelium is not primarily injured, but that the stimulating factor is removed. Spontaneous

retrogression is accompanied by a type of acquired immunity which prevents the successful reinoculation of the animal, and under favorable conditions this factor appears to be present in the blood and behaves not unlike the known antitoxins to infectious processes.

9. The blood of spontaneously recovered mice, when added to cancer material before transplantation, removes from it the power of continued proliferation. There is no evidence of cytolytic action (Clowes).

10. Tumors retrograding under the influence of the x-ray and radium present exactly the histological picture of tumors spontaneously retrograding. The stimulating factor seems to be removed from the epithelium through the aid of the immune mechanism.

11. The epithelial cells of the deeper layers of warts, after successful treatment with the x-ray, no longer proliferate to form a new wart, but reproduce normal skin (Perthes), showing that the stimulus to proliferation has been removed and that there remain epithelial cells capable of normal proliferating function.

12. The unknown factor in cancer is apparently added to normal epithelium, from which it can be removed, leaving normal epithelium. Through the proliferation of the cells of the cancer, which increase enormously, this factor must of necessity gradually increase in amount. The increase in bulk, through transplantation in mouse tumors, is associated with increased virulence. The only known agent which can fulfil these conditions is a living organism. The unknown factor may be an ultramicroscopic organism, or one that is simply undemonstrable. Filtration experiments in infectious diseases of unknown etiology are not competent to throw any light on this phase of the subject.

13. Infectious venereal granuloma of the dog, an undoubtedly infectious tumor, presents certain points of similarity to malignant processes. The tumor grows largely through karyokinesis of the tumor cells which are derived from the connective-tissue cells of the host (Bashford). The cells do not appear to possess the power of limitless proliferation, although perhaps this is not conclusively proven.

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SPECIAL INVESTIGATIONS
1906

INVESTIGATION OF SUMMER RESORTS

To ascertain the sanitary conditions of the summer resorts in the State, the Department formulated the following blank and mailed a copy to the proprietors of the hotels and boarding houses in the Catskill and Adirondack Mountains having accommodations for 25 or more people.

REPORT OF SANITARY CONDITIONS AT SUMMER RESORTS

............, N. Y., ..., 190..

To the State Commissioner of Health, Albany, N. Y.:

DEAR SIR:— The undersigned (owner or lessee).......... of the (hotel, boarding-house, camp)......................... known as ...., begs to submit the following information relating to the sanitary conditions about the same:

SITUATION

Location { Town / Village / City } of ....; County of ....

Post Office .... R. R. Station ....

Lying (give direction and distance from R. R. Station, village or city) .... and (on or near what stream or body of water, if any) ....

Altitude above sea level .... feet........

Exposure (direction and extent of the prevailing slope and exposure of the prevailing territory) ....

Adjacent waters (name, description, proximity, extent of each of the adjacent lakes, rivers and other water-courses) ....

Cultivation and forestation (relative proportion of forest, brushland, cultivated land, and water surface, within a radius of two miles) ....

Soil (clay, sandy, gravelly, porosity, depth)..................

Ground water (depth below surface of ground)...............
Temperature (mean, monthly, quarterly or yearly)............
Temperature — Maximum .... Minimum ....

CONSTRUCTION

Number of buildings with plan or description of each.
Has building a cellar or basement?.......................
Kind of buildings (timber, brick, stone)..................
Number of guest rooms...................................
Number of guests accommodated ....
Maximum capacity for accommodation of guests............

ACCESSORIES

Water supply. Describe the source and character of the potable water supply used by guests.................................

Describe the source and character of water used for cooking and supplying the guest rooms.....................................

Describe the source and character of water used for bathing...

Describe the source and character of water used for laundry purposes...

Submit copies of all recent analysis or examination of water used for either of the above purposes, specify which water and describe the circumstances attending the examination..........

If well water is used for either of the first three purposes above specified, give depth from surface of ground to bottom of well, whether dug or driven ....

Sources of possible pollution. Give a description and a minimum distance of each privy, cesspool, stable, barnyard, pigpen, poultry yard, garbage dump, etc., within 150 feet from well, and direction ....

CLOSETS

Is house furnished with water closets?.....................
If so, how many? ....
Where do water closets discharge? ....

PRIVIES

Is there a privy or privies used by guests, residents or attendants?...

Describe each privy vault (earth vault, timber, masonry, removable box, removable pail) ....

How often are privies cleaned? ....

What disposition is made of contents? ....

BATH TUBS AND WASH BASINS

How many for use of guests? ....

Where do bath tubs discharge? ....

How many wash basins with water and outlet connections? ....

Where do basins discharge? ....

SINK

How many wash and scullery sinks are there in use in house? ..

Where do they discharge? ....

WASH TUBS

Is the house or laundry equipped with stationary or common wash tubs? ....

Where do they discharge? ....

PLUMBING

How is main sewer trapped or ventilated? ....

SEWAGE DISPOSAL

Describe separately the disposition made of sewage and waste discharged from water closets, bath tubs, basins, sinks and wash tubs? ....

If cesspools give location, depth, character of walls and surrounding soil, location and outlet of overflow pipe, if any ....

GARBAGE DISPOSAL

What disposition is made of the garbage from the house? .....

Remarks:

....

....

I certify that the above information is correct and accurate to the best of my knowledge and belief.

(Signed) ....

COOPERSTOWN — OTSEGO LAKE

ALBANY, N. Y., *July* 23, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I have the honor to render the following report on my recent examinations as to the sanitary conditions of Otsego lake:

Otsego lake is situated in the north-central part of Otsego county, in the towns of Otsego, Middlefield and Springfield, the lake extending in a northeasterly direction.

The lake is 8½ miles long and the average width is 8/10 of a mile, covering 6.8 square miles. It is 1,194 feet above the sea level.

The widest part of the lake is near the north end in the town of Springfield, where the distance from the shores of Hyde bay, on the east, to the western shore of the lake, is one and one-half miles.

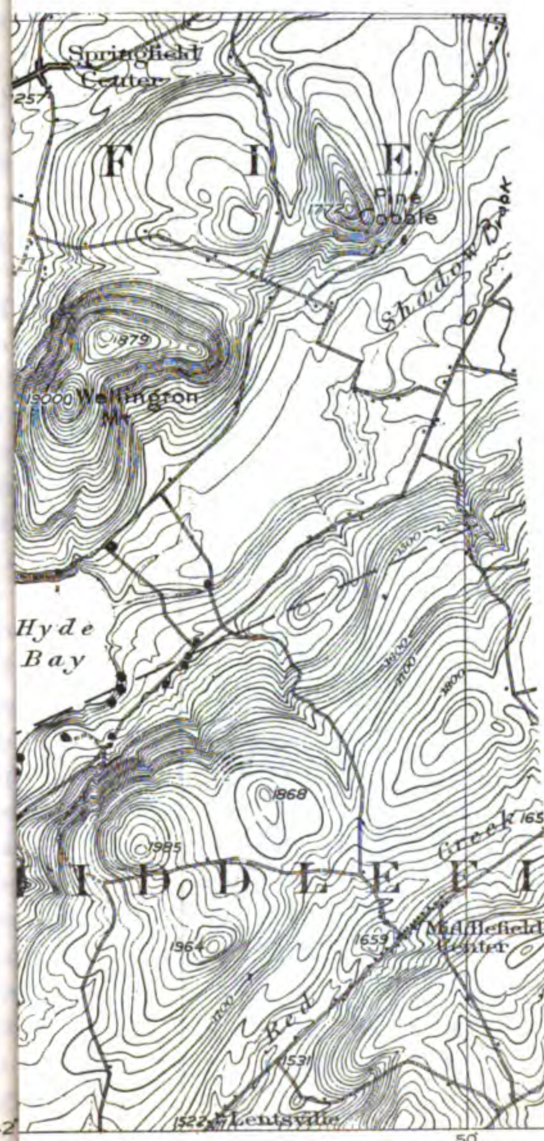
The hills along the east shore of the lake are thickly wooded, there being few open spaces, and the forest extends from mountain top down to the water's edge.

The highest elevation on the east side of the lake is about five and one-half miles from the foot of the lake, where the summit of the mountain about a mile from the shore is 1,985 feet above sea level. The next highest elevation is near the head of the lake — Wellington Mountain — which is 1,900 feet above sea level, the summit of the mountain being about one-half mile from the shores.

At the north end of the lake a good share of the land is under cultivation, and its elevation is but fifty-eight feet above the lake about one-half mile from shore.

The western shore of the lake is not as thickly wooded as the eastern, about one-half of the land back of the lake front being under cultivation by prosperous farmers.

The highest elevation on the west side of the lake is at about two and three-fourths miles from the head of the lake, where the



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the river, and the village board of health is to be complimented upon the vigilant inspections made to guard against the possible pollution of the waters of Otsego lake and the Susquehanna river.

Respectfully submitted,

F. D. BEAGLE,
Chief Clerk

SYLVAN BEACH — ONEIDA LAKE

ALBANY, N. Y., *August* 28, 1906.

Dr. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

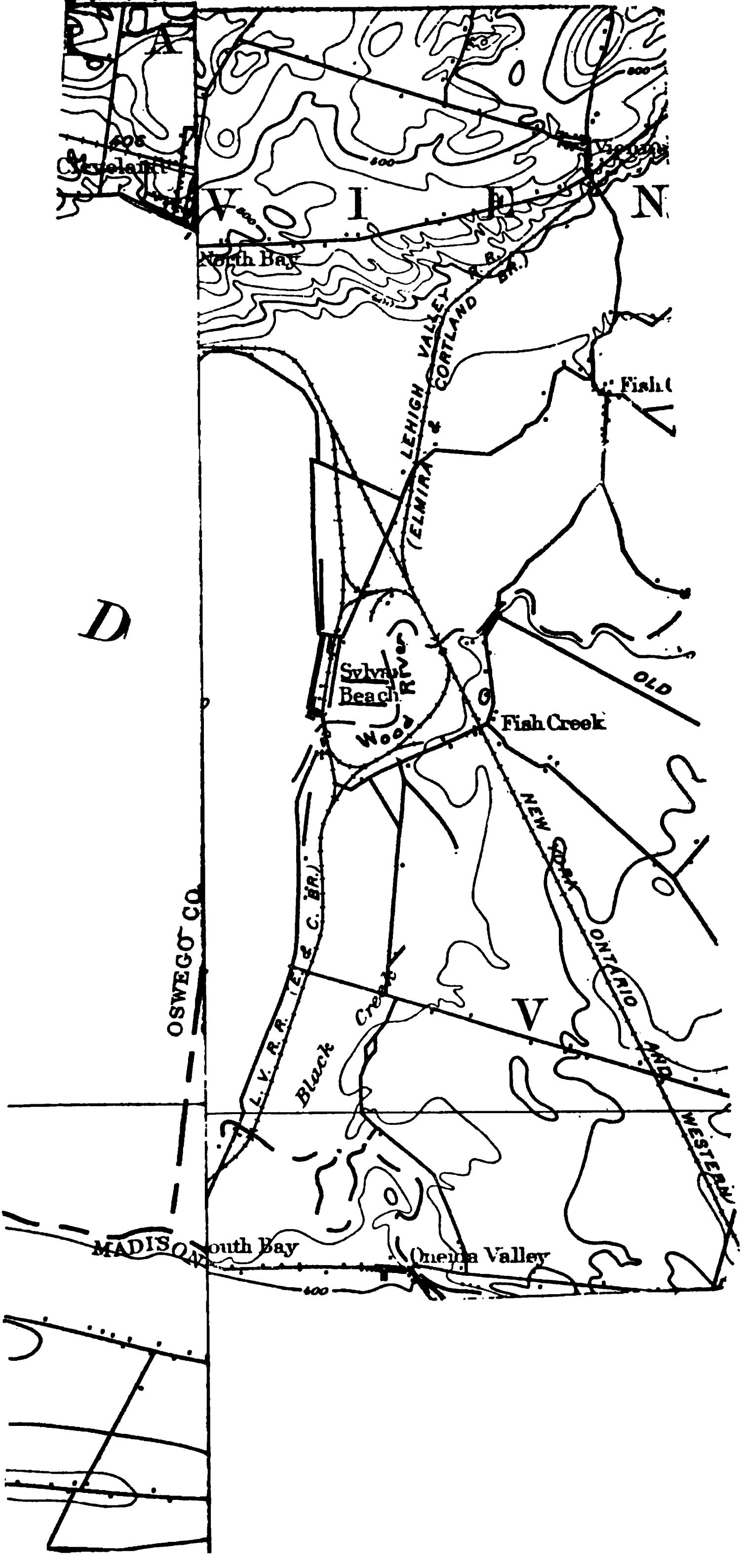
DEAR SIR.— I respectfully tender the following report covering investigations made July 28th and 29th at Sylvan Beach, Oneida lake, to ascertain the sanitary conditions of the hotels and cottages located within the municipality.

Sylvan Beach is an incorporated village located on the shores of the eastern end of Oneida lake. It is known as the "Inland Coney Island," the sand on the beach bearing great resemblance to the sea shore, and the beach is unsurpassed for bathing purposes. The lake at this point is about four miles wide and the water shallow. The elevation of the lake is 370 feet above sea level. The land bordering on the lake at this point is but a slight elevation above the lake level, and the municipality of Sylvan Beach is laid out in a grove, the surrounding country being about one-tenth forest in proportion to the cultivated land and water surface within a radius of two miles.

Sylvan Beach contains about 250 cottages, 12 hotels and 20 boarding-houses. The population varies from about 150 in the winter to 5,000 during the summer months.

The water supply is furnished by the Sylvan Spring Water Company, the reservoir being located at North Bay, and the source of soft water from the brooks located in that vicinity. The water is free from contamination, there being no barn yards, stables, pigpens, cesspools, privies, etc., located within 500 feet from the shores of the streams.

The soil at Sylvan Beach is sandy to the depth of twenty-eight feet, with clay beneath.



A
Cleveland
V I E N
North Bay
Vienna
LEHIGH VALLEY R. R.
(ELMIRA & CORTLAND BR.)
Fish Creek
D
Sylvan Beach
Wood River
Fish Creek
OLD
NEW YORK ONTARIO AND WESTERN
L. V. R. R. (E. & C. BR.)
OSWEGO CO.
Black Creek
V
MADISON
South Bay
Oneida Valley

Most of the hotels have sanitary plumbing with closets discharging into cesspools. The contents of privies is buried in the sand at remote points, and the same disposition is made of the garbage not collected by farmers.

Wood River

Wood river rises about fifteen miles north of Rome, flows southerly to Rome, thence westerly, emptying into Oneida lake at Sylvan Beach. The drainage area of the river at point of outlet is about three square miles. Some complaint was made by the citizens of Sylvan Beach relating to the pollution of the waters of the river, due to the discharge of raw sewage into this stream by the City of Rome. About twenty-seven miles of the city sewers, used by about 17,000 persons discharge into the river.

The only sewers entering the river at Sylvan Beach are the ones leading from the public park and the Forest Home Hotel. A greenish scum accumulates on the surface of the water at times. The banks of the river were free from garbage or other refuse matter at time of inspection.

Ice is annually harvested from the river for local use and also for the markets.

I was informed that several owners of property adjoining Wood river have instigated legal proceedings against the City of Rome for polluting the waters of the river.

Respectfully submitted,

F. D. BEAGLE,
Chief Clerk

On account of lack of funds the Department was unable to send out inspectors to make investigations but in few instances.

As only about one-fourth of the blanks sent out were returned to the Department properly filled out, it is fair to assume that these reports cover the hotels and boarding-houses considered by the proprietors as being in good sanitary condition.

During the summer and fall of 1907, the Department will carry on a systematic examination of summer reports and a full report of existing conditions will be published in the annual report of the

CLINTON COUNTY.

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Lyon Mountain House	Dannemora	50	Well, 10 feet deep	Privies, earthen vaults	Privy only 10 feet from well, barn 50, pig pen, 55, and garbage dump, 26 feet; also garbage dumped into brook.
Hotel Adirondack	Dannemora	45	Village reservoir, spr'g water	Village sewers	

DELAWARE COUNTY.

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Delaware Hall	Delhi	40	Springs	Cesspool 30 feet below basement over a bank and 75 feet from house. Depth, 12 feet, gravel bottom, sides walled up.	Equipped with modern plumbing electric lights. Water supply from spring in Mountains, 950 feet from house.
Fleischmann's Hotel.	Griffin's Corners	30	Town water. Spring reservoir.	Cesspool 100 ft. from house, at least 40 feet below level of house.	All precautions taken to keep premises in sanitary condition.
Shady Lawn House	Griffin's Corners	60	Village reservoir; source a collection of springs.	Cesspool below water line in gravel, built of stone.	
Terry Homestead	Harpersfield	25	Hillside spring 10 rods from house, supplies drinking water.	All sewage empties into brook. Discharge is above the flow and open to circulation of air in sewer. An arrangement for flushing the brook is used when flow is lower and liable to stagnate.	Brook runs over ½ mile through the estate below the house, ¼ mile slope. The remainder is through marsh and swamp land. Water is turned at times during boarding season in irrigating ditch on slope.
Willomere	Middletown	35	Spring 1,500 feet from house.	Cesspool. Walls stone; soil gravelly.	
Delaware Val. House.	Roxbury	Transit.	Springs—Village water	Sewer to river	
Devasego	Roxbury	40	Springs	Cesspool 30 rods from house; soil, sand and gravel.	
Park View	Roxbury	25	Mountain springs	Cesspool—10 feet deep; soil gravelly.	
Cold Spring Boarding House	Stamford	75	Springs	Cesspool—Soil, sandy	Good sanitary condition.
Greycoot Inn	Stamford	70	Village water works. Springs in the mountains.	Village sewer system.	

Hotel Miner	Arena	28	Spring	Separate cesspools. Soil gravelly.	
Fairview	Arkville	30	Springs	Cesspool — 100 feet from house. Soil porous.	
The Madison	Stamford	45	Village reservoir fed by springs.	Village sewer.	
Riverside Farm	Andes	33	Springs	Cesspool	Cesspool near bank of creek.
Hill Crest	Roxbury	20	Roxbury Water Co. Water main fed from springs.	Private sewer leading to river.	House is in first-class sanitary condition.
Lauren Villa	Roxbury	40	Village supply, spring water.	Sewer to the river	All sanitary conditions of the house have been carefully looked after.
Kendall Place	Stamford	75	Stamford Water Co.	Sewerage system of village.	Good sanitary condition.

ESSEX COUNTY.

Crater Club and Cottages.	Essex	200	Artesian well	Cesspools—Septic tanks.	
Hurricane Lodge	Keene	80	Spring for drinking and brook for general purposes.	Two cesspools. 18 feet in depth, 15 feet square. Soil gravelly.	
Glenmore	Hurricane	45	Springs	Cesspool—Sandy soil	Springs located several hundred feet from cesspool and on higher ground.
Fletcher's Farm	Bloomingdale	75	Well 47 feet deep	Cesspools	Cesspool 1,000 yards from well on lower ground.
Crawford Hotel	Keene Valley	125	In galvanized pipes from a brook.	Empties from a sewer into the Ausable river some distance away.	No dwellings or barnyards, etc., along brook furnishing water supply.
Clawbonny	Keeseville	40	Springs	Cesspool 12 and 10 feet. Soil sandy.	Barns are about 700 feet from the house. Place well kept. Water forced to large tank by windmill. All plumbing in the house first class.
Westport Inn	Westport	135	Springs	Sewer	South section of village has a scientifically installed sewer discharging into Lake Champlain a good distance out in the lake in deep water; the basement floor of the Inn cannot discharge waste matter into the sewer; therefore a private sewer discharges into the lake about 200 feet from shore into deep water. All buildings are splendidly plumbed and piped with spring water.
Whiteface Inn	Lake Placid	300	Sand brook next to hotel.	Sewer	Discharges into Lake Placid sewer system.
Grove Point House	Schroon Lake	125	Springs 250 feet above house.	Cesspools 300 feet from house.	Good sanitary condition.
Hunters' Home	Elizabethtown	60	Mountain stream	Sewer into gravel soil drainage about 500 ft. from buildings.	
Root's Hotel	Schroon River	100	Mountain spring, 1 mile from house.	Sewer	Sewer discharges into stream.

ESSEX COUNTY—(*Continued*).

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Deer's Head Inn	Elizabethtown	125	Spring water	Cesspools, sandy soil	Good sanitary condition.
Buck Mansion	Crown Point	50	Spring, ½ mile from house.	Earth closets; sewage buried daily on side hill 20 rods from house.	

FRANKLIN COUNTY.

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Saranac Inn	Santa Clara	250	Lake water, pumped to tower tank.	Concrete cesspools, disposal beds.	A great deal of attention has been given to hotel sewage. Have had experts here installing and changing system originally designed by Prof. Landreth, at a considerable expense. Utmost care is given to all waste. No pollution of water supply. Analyses made show water pure.
Riverside Inn	Saranac Lake	100	Municipal water supply of Saranac Lake village.	Saranac Lake village sewer system.	
The Waubeek	Harriettstown	175	Springs	Cesspools, 350 and 500 feet north of hotel.	Springs located on hill back and above hotel. Free from contamination.
Waukesha	Moody	30	Spring, 1,000 ft. from house.	Sewer	Sewer discharges into lake.
Lake View Farm	Tupper Lake	30	Village water supply from springs.	Cesspool, 150 feet from house.	The house is on a hill. All drainage away from house.
Roberts Cottage	Franklin	20	Spring, ½ mile from house and 150 ft. above.	Cesspool, 60 ft. from house.	
Deruches House	Saranac Lake	15	Well, 19 ft. deep	Cesspool, north of house	No source of possible pollution located within 150 ft. from well.
Franklin House	Saranac Lake	75	McKenzie pond—village supply.	Village sewer.	
Lake Lily Cottage	Brighton	15	Driven well	Cesspool	Cesspool, about 120 ft. from well on slope below well.
Banner House	Bellmont	60	Spring near house	Sewer into cesspool 125 ft. from house.	
Lake Mountain Hotel	Duane	100	Spring	Cesspool and dry closets.	
Loon Lake House	Loon Lake	350	Springs about a mile from house, in forests.	Sewer into settling basin about ½ mile from house.	Good sanitary condition.

The Brighton	Rainbow	30	Spring and well water.	Cesspool, 200 ft. from house at bottom of hill.	Well 52 ft. deep located on Sugar Loaf hill near house.
Saranac Club	Bartlett Carry	85	Spring	Cesspool, 800 ft. from buildings, 20 ft. lower.	Spring located on ground away from building on higher elevation.
Hotel Ayres	Malone	90	Spring located on elevation above house.	Cesspool, ½ mile from house.	
The Berkeley	Saranac Lake	60	McKenzie pond—village water supply.	Village sewers.	

GREENE COUNTY.

Catskill Mt. House	Catskill	285	Brook fed by spring in spruce forest 2½ miles distant.	Sewer	No buildings, etc., along source of water supply.
Pleasant Home	Union Society	50	Spring and well	Box closets; contents buried ¼ mile away.	Spring located in mountain; well 60 ft. deep.
Sach's House	Prattsville	60	Well—20 ft. deep	Cesspool 100 ft. in rear of house. Soil gravelly.	Schoharie Kill creek near boarding house is polluted by refuse of creamery and sugar plant. The bottom of the creek is covered 2 inches with waste matters and cannot be used by bathers. It creates an unbearable stench and is very injurious to all in lower part of village, and was supposed to be the cause of fever last year and two years ago.
Thompson House	Windham	60	Pumped from the Batavia by windmill—1 well, 30 ft. deep.	Earth closets. Contents buried.	Two privies 100 ft. from well but on lower ground.
The Gorham	Prattsville	45	Driven well for drinking purposes, and village water supply for cooking.	Cesspools in slope below house.	
Hotel Kaaterskill	Hunter	1,400	Driven well, 34 ft. in solid rock.	Sewer to settling tank 1,000 ft. from hotel, and subjected to filtration over area of sand and gravel 1 mile in area.	No privy, cesspool, barnyard, pigpen, etc., on premises. Water supply free from contamination.
Houghtaling House	Prattsville	50	Driven well, 18 ft. deep.	Sewer into Schoharie creek.	
West End Hotel	Hunter	125	Hunter water works	Cesspool 400 ft. from house—soil gravelly.	
Hotel Martin	Tannersville	125	Spring and reservoir	Cesspool, 20 ft. deep; overflow on meadow.	
St. Charles Hotel	Hunter	350	Artesian wells	Closets buried.	
New Conston Park	Union Society	80	Mountain springs	Sewer	Sewer discharged in open field.
Upland Farm	Hunter	70	Springs on mountain above house.	Sewer into stream on premises.	

GREENE COUNTY—(*Continued*).

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Lexington House	Lexington	75	Springs	Cesspool	Sanitary plumbing throughout.
The Elmhurst	Hunter	20	Springs	Cesspool	Overflow from cesspool into stream.
The Evergreens	Tannersville	8 rooms. No gue'ts taken.	Village water supply	Cesspool, 6 ft. deep, 5 ft. wide and 20 ft. long.	General sewerage of village is very bad. Some hotels empty directly into the streams within 200 ft. of their hotels. Along one brook at least four hotels, houses and stores empty all sewage directly into the stream, which is not large enough to carry it away. A sewerage system is needed badly.
Haines Falls House	Haines Falls	90	Spring, 600 ft. from house.	Sewer 800 ft. long discharging over sun-exposed cliff into gully.	The drainage problem of the community deserves consideration, for with Twilight and Sunset parks close by and other houses further up the stream, and summer population growing, it is important to have the drainage properly looked after.
Garas Hotel	Hunter	25	Village water supply	Cesspool 100 ft. from house.	
Woodard House	Tannersville	75	Well water	Cesspool	Well is located near barn.
Westkill House	Westkill	75	Driven well	Earth vaults, and cesspool 150 ft. from house.	
The Weldon	Tannersville	35	Village water supply	Cesspool 150 ft. from hotel.	
The Monroe House	Lexington	40	Spring [illegible] mile up mountain side.	Cesspools near house.	

HAMILTON COUNTY.

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Lake Peseco Inn	Rudeston	30	Spring	Removable boxes — contents buried.	Good sanitary condition
Irondequoit Club House.	Arietta	40	Spring ¼ mile from house.	Removable boxes — contents buried.	Good sanitary condition.
Rudes House	Rudeston	30	Spring	Earth vaults — contents buried.	One privy within 60 ft.; one within 150 ft. of water supply.
Rocky Point Inn	Inlet	100	Spring	Sewer into lake.	
Indian Lake House	Indian Lake	20	Reservoir fed by mountain streams.	Removable boxes— contents buried.	Barn and privies located below water supply.
Peseco Lake House	Arietta	15	Dug well—18 ft. deep.	Earth vaults — contents buried.	
Abrams' Summer Boarding House.	Arietta	20	Dug well—11 ft. deep.	Earth vault and removable boxes—contents buried.	Privies 75 ft. from well; barn and hen house 100 ft.

Hutchins Camp	Indian Lake	56	Spring 100 ft. from house in mountain side.	Sewer into lake 500 ft. from house.	Good sanitary condition.
Hosley House	Wells	50	Spring	Sewer into stream	Hotel and cottages are kept in cleanly condition.
Bald Mountain House.	Webb	125	Spring in mountains, 50 ft. elevation above hotel.	Sewer into stream, 500 ft. from house.	
Blue Mt. House	Indian Lake	125	Mountain springs	Cesspools on side of hill sloping from house.	
Blue Mt. Lake House Cottages	Indian Lake	50	Mountain spring	Cesspool and privies with removable pails.	
The Antler	Raquette Lake	100	Spring ¼ mile from house.	Cesspools—soil sandy.	
Brightside, and Four Cottages.	Raquette Lake	50	Spring ½ mile distant	Cesspools about 25 ft. from cottages.	

HERKIMER COUNTY.

Leslie W. Brown Camp	Webb	12	Springs ½ mile from camp.	Cesspools near camp. Soil sandy and gravelly.	
Wood's Camp	Webb	....	Driven well 20 ft. deep.	Privies — contents buried 300 ft. from camp.	
Forge House	Old Forge	125	Spring water ¼ of a mile from house.	Sewer into river.	
Dart's Camp (main building and 8 cottages).	Webb	100	Mountain spring	Cesspools—soil sandy	Good sanitary condition.
Camp Mohawk and cottages.	Webb	60	26-ft. driven well	Cesspools on slope below buildings.	
Camp Fulton	Old Forge	50	Driven well	Cesspools 35 ft. from house. Soil sandy.	Sinks discharge into lake.

LEWIS COUNTY.

New Hermitage	Diana	125	Well and lake water, fed by springs.	Cesspool	Overflow from cesspool enters lake.
Forest Home	Diana	75	Well, 25 ft. deep	Earth closets — contents buried.	Privy and poultry yard 75 ft. from well
Norton's Adirondack resort;	Watson	30	Spring	Earth vaults — Contents buried.	
Bald Mt. House	Croghan	75	Spring 400 feet from house.	Sewer into river.	

LEWIS COUNTY—(Continued).

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Oswegatchie Lake House.	Croghan	100	Dug well 12 ft. deep at base of hill.	Privies—Contents buried	No source of possible polution near well.
Lake Brantigham Inn.	Greig	90	Driven wells	Cesspool	Grounds in sanitary condition.

ONEIDA LAKE — SYLVAN BEACH.

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Dr. Cavanas Sanitarium.	Sylvan Beach	35	Gravity system, reservoirs and brook.	Cesspool and sewer	Good sanitary condition.
St. Charles Hotel	Sylvan Beach	140	Sylvan Spring Water Co.	Four cesspools, brick and cement.	Buildings and grounds in good sanitary condition.
Temperance House	Sylvan Beach	50	Filtered cistern water.	Removable boxes — Contents buried.	Hotel and grounds in good condition.
Forest Home	Sylvan Beach	100	City water	Sewer into Wood river	Hotel open year round. Appeared in good sanitary condition.
Leland House	Sylvan Beach	44	City water	Privy—Contents buried	This hotel will go out of commission this summer, being on land bought for barge canal.
Eagle Hotel	Sylvan Beach	44	City water	Privy—Contents buried.	
O. & W. Hotel	Sylvan Beach	32	City water	Cesspool 20 ft. from house.	
Oneida Lake House	Sylvan Beach	52	City water	Removable boxes — Contents buried.	
The Windsor	Sylvan Beach	100	City water	Cesspool, cement and stone. Located under house.	
Lake View House	Sylvan Beach	14	City system	Cesspool near hotel.	
Hotel Noble	Sylvan Beach	28	City system	Removable boxes — Contents buried.	Open summer and winter. Buildings in good repair and sanitary surroundings good.
Darrow House	Sylvan Beach	20	City water	Cesspool near hotel.	
Oneida Hotel	Sylvan Beach	28	City water	Sewer discharging into Wood river.	
The Star	Sylvan Beach	12	City water	Sewer discharging into Wood river.	

ONEIDA COUNTY.

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Otter Lake Hotel	Forestport	75	Spring	Removable boxes—Contents buried.	
Steedor House	Forestport	30	Dug well, 60 ft. deep	Removable boxes — Contents buried.	

ORANGE COUNTY.

Hotel Ferncliff	Warwick	168	Springs	Drain into cesspool	Complaint was made against the sewage from this house in the earlier part of the season. Two pumps are used in the boiler house, one to pump water from the lake and one to pump sewage. The boiler capacity will only operate one at a time with one engineer. The cesspool would overflow and follow a ravine towards the lake. Two engineers are now employed running pumps constantly. The cesspool is too small and boiler capacity insufficient. Manager stated that these were to be remedied before next season. The portion of the ravine where sewage overflowed has been covered with cinders.
Willow Point Hotel	Greenwood Lake		Spring	Cesspools	Garbage has been drawn away and dumped in a mountain road. Suit has been brought against the proprietor by the Greenwood Lake Association for the offensive manner in which he has disposed of his garbage. System of cesspools in use in the porous soil seems to be a practical manner of disposing of sewage in that location as there are no wells or springs on the slope to be contaminated.
Mountain Spr'g House	Greenwood Lake	70	Spring	Taken away	Tank for holding kitchen waste had become offensive. After calling attention to it, they cleaned it thoroughly and used disinfectants.
Valley Hotel	Greenwood	100	Well and mountain spring.	Cement vault	400 acres of land are connected with this house, giving plenty of room for disposal of refuse.
Brandon House	Greenwood	200	Spring	Cesspools.	
Hotel Ferncliff	Greenwood Lake	168	Spring located several hundred ft. from hotel.	Cesspool 200 ft. from house.	Sewage is pumped from cesspool over hill in woods. Complaint made to Department of nuisance caused by overflow from cesspool into ravine leading to lake. Investigated by Department, and management of hotel is to remedy conditions before opening of next season.
Willow Point Hotel	Greenwood Lake		Mountain spring 1,750 feet west of hotel.	Three cesspools 10 ft. deep, walled up. Soil gravelly.	Garbage not properly disposed of, being dumped near mountain road.
Mountain Spr'g House	Greenwood Lake	70	Spring water	Removable boxes—Contents buried.	Kitchen slops are emptied into cement tank outside and siphoned over a slope into a lot south of the hotel.

ORANGE COUNTY—(*Continued*).

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Valley Hotel.........	Greenwood Lake.....	100	Mountain spring, 4,000 feet from house.	Cement vault — Contents buried.	Kitchen slops and laundry water discharged into small stream draining swamp.
Brandon House......	Greenwood Lake.....	150	Spring..............	Cesspool on slope near ravine.	
			OTSEGO LAKE.		
Glimerglass Camp....	Otsego Lake.........	10	Spring..............	Privy—Contents buried...	Good sanitary condition.
The Pines...........	Otsego Lake.........	20	Dug well, 14 ft. deep..	Privy—Contents buried...	Good sanitary condition.
Hickory Grove.......	Otsego Lake.........	20	From spring, but mostly from lake.	Removable boxes—Contents buried.	Good sanitary condition.
Dugway Camp.......	Otsego Lake.........	8	Spring 40 yds. from camp.	Removable vault—Contents buried.	Good sanitary condition.
Rockwood Camp.....	Otsego Lake.........	25	Dug well, 13 ft. deep..	Privy—Contents buried...	Good sanitary condition.
Hutters Point........	Otsego Lake.........	16	Spring, 150 ft., rear of house.	Privy—Contents buried...	Good sanitary condition.
Eldred Point Camp...	Otsego Lake.........	12	Spring, 250 ft. from house.	Privy—Contents buried.	
Five Mile Point Hotel.	Otsego Lake.........	20	Spring on hill, 60 rods from hotel.	Cesspool. Soil sandy.....	Small creek flows on south side of hotel, manure pile, 20 ft. from creek. Barn proper is about 70 ft. from the creek and hotel, 120 ft. Aside from location of manure pile everything about the house and grounds looked neat and clean and sanitary conditions may be considered good.
Otego House.........	Otego...............	30	Spring water, gravity system.	Cesspool, 300 ft. on slope rear of house. Soil gravelly.	Buildings and grounds in good sanitary condition.
			ST. LAWRENCE COUNTY.		
Grove Hotel.........	Star Lake...........	24	Two dug wells, 25 ft. deep.	Timber vaults — Contents burned.	Main well, 60 feet from outhouse.
Nunn's Inn..........	Clifton.............	50	Spring, ¼ mile from house.	Removable boxes—Contents buried.	Well on premises, but not used.
Deremo Hotel........	Clifton.............	75	Spring..............	Sewer into lake.	
Jock Pond Hotel......	Childwold...........	30	Spring and wellwater..	Sewer into Jock pond......	No privy, barn yard, stable, etc., within 200 feet of well.

Lake View House	Piercefield	70	Driven well, 22 ft. deep	Privies—Contents buried.	
Fernwood Hall	Hopkinton	35	Spring water	Cesspools, 60 ft. from house. Soil gravelly.	
Star Lake Inn	Star Lake	160	Lake. Intake pipe is 150 ft. from shore.	Cesspools, 150 feet from house.	Cesspools are located in very porous soil and kept clean. The Star Lake Protective Association looks carefully into sanitary conditions of the lake. No drainage of any kind is allowed to go into the lake, and, at the head of the association is a physician of repute, who looks after sanitary conditions.
Evergreen House	Clifton	30	Dug wells, 16 ft. deep	Privy—Contents buried.	

SARATOGA COUNTY.

River Rock Hotel	Hadley	20	Garner's Water W'rks, village main.	Privies—Contents buried.	
Arlington Hotel	Hadley	40	Reservoir	Cesspools.	

SCHOHARIE COUNTY.

Gilboa House	Gilboa	75	Public water works, supply coming from springs.	Sewer into cesspool under bed of creek.	There are surrounding conditions that could be improved upon.

ULSTER COUNTY.

Grand Hotel	Highmount	400	Mountain springs	Sewer	The sewer empties over rack in sewer house, and solid matter is removed each day.
The Irvington	Woodstock	75	Driven well, 138 feet deep.	Cesspool, 50 ft. from house. Soil gravelly.	Good sanitary condition.
Mountain View House	Bushnellville	16	Spring, 400 ft. from house.	Removable pails—Contents buried.	
The Waldorf	Phœnicia	100	Phoenicia water W'ks Co.	Cesspool; soil gravelly	Cesspool located near creek.
Simpson House	Phoenicia	30	Spring water	Sewer discharging into a rocky place between house and Esopus Creek.	
Mount'n Brook House	Bushnellville	30	Spring	Removable pails — Contents buried.	
Roxmor	Shandaken	70	Mountain springs	Cesspools; soil gravelly.	
The Wellington	Shandaken	100	Spring water supplied from a reservoir.	Cesspool, rear of premises. Soil sandy and gravelly.	
Mountain View House	Pine Hill	50	Crystal spring	Cesspool.	
Weidner House	West Shokan	30	Springs	Earth privies—Used as fertilizer.	
Grampian	Highmount	60	Springs	Cesspools, 500 ft. from house.	

ULSTER COUNTY—(*Continued*).

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
Griffin's Farm House	Shandaken	30	Spring	Privy vault—Contents carried away and deposited ¼ to ½ mile from stream or house.	
Rosenthal Cottage	Shokan	20	Dug well, 30 ft. deep	Removable boxes—Contents buried.	Two privies and barn about 100 ft. from well.
La Ment's Hotel	Big Indian	30	Spring	Cesspools 200 ft. from house. Soil gravelly.	
The Alpine	Pine Hill	125	Reservoir, spring water	Cesspool.	
Washington Inn	Phœnicia	250	Mountain springs from reservoir.	Sewer into creek.	
Rip Van Winkle House	Pine Hill	175	Spring, 2,000 ft. from buildings.	Cesspools below house, walled up.	
Beaver Dam Farm	Olive	60	Dug well, 28 ft. deep.	Privies—Contents buried.	
Mead's	Woodstock	90	Spring and dug well, 22 ft. deep.	Removable boxes—Contents used as fertilizer.	

WARREN COUNTY.

(LAKE GEORGE.)

NAME OF HOTEL.	Location.	Number of guests.	Water supply.	Sewage disposal.	Remarks.
The Antlers	Caldwell	100	Springs	Cesspools; soil sandy.	
The Iroquois	Hague	50	Lake water	Cesspools; soil porous.	
Sabbath Day Pt. House	Hague	45	Spring, 1,500 feet from house.	Earth vault	There is no drainage from the house of any kind to the lake and the spring is away from all buildings a distance of 1,500 ft. or more.
The Sagamore	Bolton	250	Spring, 500 ft. above, and 1½ miles from hotel.	Cesspools and a well syphoning over a drainage area through tiles.	Plans are being prepared for a comprehensive system that will carry all sewage to septic tanks emptying into filter beds from which the effluent will discharge over the drainage area.
Diamond Pt. House	Caldwell	40	Spring near lake	Closets — Contents buried every morning.	
Bartlett House	Hague	20	Dug well fed by springs	Closets—Contents buried.	
The Hillside	Hague	70	Spring	Cesspool, 50 ft. from house. Soil sandy.	
Lake View House	Bolton	100	Spring, ¼ mile from house.	Cesspools. Soil gravelly	Good sanitary condition.
Rising House	Hague	65	Mountain spring	Cesspools. Soil, sandy	Good sanitary condition.
The Albion	Queensbury	40	Mountain spring	Cesspool. Soil, sandy.	
Hotel Marion	Marion	250	Spring water	Cesspool, 250 ft. from house	

Silver Bay Associa'n	Hague	300–600	Mountain spring, 1,600 feet from hotel.	Cesspools. Soil, gravelly	The corporation employs a physician, Dr. W. C. Gardner of New York city, who is on the grounds and has authority in all matters relating to health.
Grove House	Queensbury	50	Lake water	Vaults—contents buried.	
Fernwood	Lake George	40	Mountain spring	Cesspool 600 ft. from house. Soil sandy.	
The Worden	Lake George	60	Lake George water works, gravity system.	Cesspools, soil sandy.	
The Arlington	Lake George	34	Lake George water works.	Cesspools.	
Phoenix Hotel	Hague	35	Mountain spring	Earth vault and cesspool.	
Wayside Inn and cottages.	Luzerne	150	Luzerne water works	Privies and cesspools.	

WASHINGTON COUNTY.

Hulett House and cottage.	Hulett's Landing	250	Cascade brook	Cesspools, soil gravelly	Each cottage has a cesspool. No drinking wells used near any of the buildings.
Pearl Point	Pearl Point	100	Lake water	Cesspool. [illegible]	

YATES COUNTY.

Natural Science Camp	Barrington	100	Spring and Keuka lake	Cesspools, soil gravelly.	

REPORT SHOWING SANITARY CONDITIONS OF SLAUGHTER-HOUSES

Upon the publication of the report made by the President to Congress on the unsanitary condition of the slaughter and packing establishments in certain sections of the country the charge was made that the slaughter-houses of other localities were in no better condition.

To determine the conditions as they existed in this State and because our appropriations did not permit the sending of trained meat inspectors it was decided to order the local health officers to examine the slaughtering establishments within their jurisdiction and to report the sanitary conditions existing in and around the same to this Department.

To this end the following letter was sent to each local health officer in the State.

ALBANY, N. Y., *June* 7, 1906.

Dr.........................

Health Officer

......................*N. Y.*

DEAR DOCTOR:

In view of the report recently made to Congress dealing with the existing conditions in certain slaughter and packing houses in the United States, the Department deems it essential that an immediate and thorough inspection be made by you of any and all meat packing establishments or slaughter-houses for animals, if any such are now maintained within your jurisdiction.

Any such conditions as those outlined in the report above alluded to and commented on by President Roosevelt in his special message to Congress accompanying the report are intolerable and must not be allowed to continue if they exist in this State.

The evidence thus far submitted warrants at least a speedy and painstaking inspection, and a prompt and full report of conditions actually found to exist.

In order to make this examination as satisfactory as possible the Department suggests that you proceed in the following order:

POINTS

(1) Conditions of yards, pavements, pens and platforms.
(2) Buildings:
 (*a*) Construction.
 (*b*) Lighting.
 (*c*) Ventilation.
 (*d*) Equipment. { Work tables, tubs, carts, utensils.
 (*e*) Sanitary conveniences.
(3) Treatment of employees.
(4) Methods of handling meats { sanitary unsanitary
(5) Inspection, value of.

Particular notice should be paid to unsanitary conditions in which meats, etc., are handled, ventilation of buildings and methods of handling meats.

The report alluded to alleges very serious conditions in these respects and if there are any meat packing establishments or slaughter-houses in your jurisdiction, I would be glad to have a report from you regarding them on the lines above suggested.

Very respectfuly

EUGENE H. PORTER,
Commissioner of Health

Those reporting that there were no slaughter-houses within their jurisdiction were twenty-five in number.

Reports from ten health officers gave but little definite information.

Reports from 116 health officers stated that the slaughter-houses within their jurisdiction were conducted in a proper manner and were in a good sanitary condition.

Reports of health officers showing that bad sanitary conditions exist are given in some detail. The descriptions of these conditions speak for themselves.

Every health officer making a report of such conditions received a letter from the Department requesting him to order the correction of the unsanitary conditions and to frequently inspect these establishments to see that they were properly conducted in the future.

In addition to these inspections of the local slaughter-houses by the health officers, the Department has made special investigations of slaughtering establishments against which complaints were made in the following places: Batavia, Bridgewater, Candor and Downsville.

Reports from the health officers of the following places state that the slaughter-houses within their jurisdiction were in good sanitary condition.

Almond,
Arena,
Averill Park,
Belfast,
Ballston,
Belleville,
Bethel,
Bethlehem,
Brookfield,
Canandaigua,
Canton,
Cayuga,
Central Square,
Cherry Creek,
Chester,
Churchville,
Clarence,
Clarendon,
Clyde,
Cortland,
Croghan,
Delhi,
Dunkirk,
East Aurora,
Exeter,
Fairport,
Fleischmans,
Fort Covington,
Frankfort,
Franklin,
Fulton,
Geneseo,
Geneva,
German Flats,
Germantown,
Gilboa,
Gilbertsville,
Gouverneur,
Gowanda,
Greene
Greenville,
Half Moon,
Hamlin,
Harrisville,
Hartford,
Hector,
Helena,
Hempstead,
Herkimer,
Honeoye Falls,
Hyde Park,
Irondequoit,
Ithaca,
Java,
Jordan,
Kingston,
Lima,
Lorraine,
Lowville,
Madrid,
Malone,
Margaretville,
Mayville,
Medina,
Mohawk,
Montezuma,
Moriah,
Muncy,
Naples,
Nassau,
Newark,
Niagara Falls,
Nicholville,
Norfolk,
Olean,

Otego,
Otto,
Palmyra,
Panama,
Parish,
Penfield,
Phelps,
Porter,
Port Jervis,
Ransomville,
Red Hook,
Redwood,
Rensselaerville,
Rhinebeck,
Roseboom,
Rosendale,
St. Johnsville,
Salem,
Salina,
Sanborn,
Saratoga Springs,
Sidney Center
Southport,
Spencerport,
Tonawanda,
Troy,
Truxton,
Victor,
Victory,
Virgil,
Volney,
Wallkill,
Warren,
Warsaw,
Washingtonville,
Waverly,
Wayland,
Wellsburg,
Wellsville,
Westfield,
Westport.

Reports from the health officers of the following places contained but little definite information and the places are therefore not included in the tables.

Adams,
Bath,
Binghamton,
Bridgewater,
Cazenovia,
Clayville,
East Fishkill,
Lysander,
Paris,
Potsdam.

Reports were received from the health officers of the following places stating that no slaughter-houses exist within their jurisdiction.

Ballston Spa,
Briar Cliff Manor,
Canastota,
Constableville,
Hamilton,
Hammond,
Johnstown,
Lawrence,.
Lewis,
Little Valley
Lockport,
New Hartford,
Niles,
North Greenbush,
Norwich,
Oswego,
Patchogue,
Penfield,
Pittstown,
Randolph,
Rockville Center,
St. Regis Falls,
Salisbury,
Schenectady,
Somerset.

ALBION

Has two slaughter-houses about a mile from the village; neither of them have any particular sanitary conveniences. The conditions of the yard back of one of the slaughter-houses were filthy beyond description. Offal eaten by hogs. Killing floor was fairly clean. The inside of the building was very dirty.

The other slaughter-house was found in better condition.

ANGELICA

Has two slaughter-houses; no pavement in yards; simple boarded buildings; very dirty, no water supply; poorly lighted; no windows. Meats handled in a fairly sanitary manner.

AVOCA

One slaughter-house located outside the corporation, was in an unsanitary condition and unfit to use. The putrid blood was very bad, had not been cleaned in months. The pen contained three hogs which were given the refuse of the killing. The room off the main building where the blood ran and had collected, was well-alive.

BALLSTON

Slaughter-house is located on the banks of Gordon creek. Through the yard is a small running stream which empties into Gordon creek, and there is more or less contamination of said creek.

BETHEL

Has three slaughter-houses.

The one at Mongaup Valley is a wooden building, tight floor, dry ground. No odor. The waste is taken away immediately.

One at North White Lake, one mile north in a vacant lot. Not in use, calves butchered in the field where they are bought. Waste left where killing takes place.

One in Bethel, butchers in barn; tight floor; dry ground and yard. Waste buried in manure pile.

BROCTON

Slaughter-house is constructed of wood; condition of yard is fair. No platforms; no lighting or ventilation. Building is located in a field about forty rods from nearest house. Pigs kept on waste from slaughter room.

CAMILLUS

Four small slaughter-houses, frame buildings. The yards and pens are unsanitary. The hogs are fatted on the offal from the slaughter-houses. Buildings are very small with the exception of an old tobacco barn. No facilities for lighting. Equipment very poor. In the majority of cases the method of handling meat is unsanitary.

CANASERAGA

Slaughter-house is unsanitary, especially the floor and yards.

CASTILE

Slaughter-house is far from sanitary. The yard adjoining house was in a deplorable condition. There were at least two wagon loads of bones in the yard. There were sixteen shoats to eat the offal. The shoats were also fed sour milk. The side of the house was covered with dried blood. There were flies by the million.

CATLIN

The slaughter-house located at Chambers, is a small building about forty rods from the highway. The blood and offal is thrown to hogs to eat. The building is on low swampy land and the odor from the hogpen almost overpowering.

The slaughter-house at Catlin is a small building with wide cracks in the floor down which the blood is allowed to run. Outside the entrance were the paunch and entrails from the last slaughter which was most offensive and covered with a swarm of flies. Near this was a pile of bones, heads, etc., all was most offensive.

The slaughter-house at Beaver Dams was in a fairly good condition. No odor except from the attached hogpen. Inspector expected, proprietor had cleaned up.

CENTERVILLE

Slaughter-house is constructed of wood. The yard is six to fifteen inches deep with mud. Building is part of a barn. Stock kept and slaughtered in the yard. No sewer connections. Cleanings and blood thrown into the yard with stock. Slaughter building is located in the village only seven rods from a church. Odor on a warm day is fearful.

CHEEKTOWAGA

Slaughter-house on a farm near the town line of Amherst. The yards are filthy, with no pavements and the buildings are rather a collection of shacks. Tables, tubs and other utensils are very unclean, evidently have not been cleaned since first bought. The floors and walls are covered with manure, blood, etc., several inches thick. A pig sty next the killing room added to the uncomfortable and obnoxious smells. A dead rat was on a shelf where meat is laid. There were a few other rats running about the place. The plant lacked the most fundamental rules as to cleanliness. There were two people employed who were far from clean. In fact they were dirty.

COXSACKIE

Slaughter-house is an old barn. The yards and pavements are filthy. The building is not suitable, and the method of disposing of the refuse was filthy to an extreme degree.

EAST AURORA

Four slaughter-houses located in East Aurora, three of which were reported in good sanitary condition. One reported as being a wooden building, lighting and ventilation good. Utensils clean, but yards used as a dumping ground. Hogs fed on the waste. Methods of handling meats unsanitary.

ELBA

Slaughter-house constructed of rough boards. Words would not describe the condition found. Pigpen on one side, cesspool on the other, from which water is taken for all purposes. Building used both as slaughter-house and cooling room. The whole place alive with maggots; not one sanitary feature about the place.

ELBRIDGE

The slaughter-house is located on the bank of Skaneateles outlet. There is a large yard used as a dumping ground for the refuse which is partly consumed by a herd of swine. The blood is drawn into tubs and dumped into the feeding troughs. The ground around the feeding place has been converted into a "wallow." The bones are gathered up twice a year. The floor of the killing room is in poor condition, 7,000 sheep, 320 cattle and 200 calves, besides a number of hogs, are slaughtered yearly. There are no sinks or running water.

FORESTVILLE

Three slaughter-houses in fairly good condition. Offal fed to swine.

One slaughter-house only used occasionally. Some objectionable filth around the yard. Built over a small stream. Slops seemed to be disposed of into the small stream.

FORT ANN

One slaughter-house on the outskirts of the village, has a low muddy yard, ordinary wooden pens, frame buildings; well lighted. Entrails and lungs fed to hogs.

The other slaughter-house is in about same condition, excepting a large number of bones scattered around.

HOBART

Slaughter-houses are constructed of wood, yards are very dirty; lighting and ventilation good. Equipments quite clean. Method of handling meats unsanitary.

HURON

There is one slaughter-house. Yard has not been properly cleaned in a year, a decaying hog was ordered removed and the slaughter-house put in a sanitary condition.

KENDALL

One slaughter-house, a building about twenty-five rods from a dwelling; the yard on two sides of the building held seven pigs

about two months old. There was a trough into which drained the blood of the slaughtered animals, and the pigs were supposed to drink it. On the other side of the building was a heap of decomposing intestines upon which the pigs were feeding. In the same yard was a pig that had been dead several days. The building was of wood, about twenty feet square, containing one large room and two small rooms or stalls. In one of the stalls was a heap of hides from which came a strong odor.

LEE

There are nine slaughter-houses.

No. 1. Is an old cornhouse; adjoins a cow barn; ventilation and light through cracks. Sanitary conveniences very poor.

No. 2. Located in part of an old barn; lighted from door and cracks; hogpen in killing room, filthy.

No. 3. Building is part of an old stable; method of handling meat very unsanitary.

No. 4. Good pens and yards; new wooden structure attached to hoghouse. Method of handling meat unsanitary.

No. 5. Yards fair, platform good. Wooden building, cement floor; ventilation good. Method of handling meat sanitary.

No. 6. Building one end of an old barn. Equipments good. Method of handling meat sanitary.

No. 7. Frame building, lighting good. Yard is poor. Method of handling meat unsanitary.

No. 8. No yards, pavements or platforms. Frame building attached to a horse barn; lighting and ventilation good. Method of handling meat sanitary.

No. 9. Wooden building, part of a barn; lighting and ventilation poor. Meat wagon unsanitary.

LITTLE FALLS

Yards, pavements, pens and platforms are kept fairly clean. No offensive smells other than necessary where animals are kept. Stone buildings, floors are wood and it is impossible to keep them clean and free from odor owing to blood and washings from animals. The same remarks apply to the tables and tubs. Good

light and ventilation. The worst feature of this establishment was its location in the midst of the city and near residences and factories.

Lodi

Slaughter-house has a yard with twelve or fifteen hogs in it where the conditions are bad. There is a platform uncovered and a trough for feeding hogs. To get to this platform the hogs have to wallow through mud up to their bellies; the whole yard is littered with skulls, hoofs and forelegs of slaughtered animals. Their feed is the blood and offal of slaughtered animals, with cooked beans and swill. The building used as a slaughter-house is a cheap wooden structure and in one end the killing is done. The other end of the room contains the hog feed, swill, etc., In a shed adjoining are the hides.

Maine

There are two slaughter-houses. The first slaughter-house east of the village, thirty rods from the main street, was well kept; could detect no odor more than would come from a farmer's pig sty. Lime was freely used, and every thing in a good sanitary condition.

The second slaughter-house is very unsanitary. The floors are rotten and filthy, entrails in a moldy condition were upon the floor, where they must have lain two or three days, and the stench indescribable. This slaughter-house is also east of the village, and about five rods from the public highway.

Marbletown

One slaughter-house is situated in the center of the village of Stone Ridge. The slaughter-house is in the rear of a farm barn. Offal is fed to the hogs.

One butcher does his butchering on a barn floor, situated about three-quarters of a mile from the village. The offal is carried away and thrown into the hog yard. The barn floor was in a sanitary condition.

One slaughter-house in the village of High Falls, on the outskirts of the village, is used exclusively as a slaughter-house.

The offal and blood is deposited in a hog yard some distance away from the building. Good condition.

One slaughter-house just in the rear of meat market. Offal carried away. Good sanitary condition.

MEXICO

There are four slaughter-houses, wooden buildings. Yards in fair condition. Equipments scanty. In one slaughter-house the pens were filthy.

MINOA

One slaughter-house is situated about 300 feet from main highway. There is no pavement or platforms. At the back is a yard that receives the offal and refuse. The ground slopes slightly so that the back of the building is about four feet above the ground water from the rains, and with the blood, heads, legs and guts of several animals lying around maggots can be scraped up by the quart. The building is of wood, with no windows. Ventilation is by knot holes and cracks. The floor is covered with blood and dirt from one-half inch to an inch in depth, sides spattered all about with dried blood, roof hanging with dusty cobwebs, chopping block thick with grease and filth. Filthy old suits of clothes covered with blood hanging on the meat hooks, and about the floor several calves legs. A more nasty, stinking place would be hard to find.

One slaughter-house where only one calf had been butchered in it since snow went away, is an old house moved back from road. The plaster was hanging in pieces. On the floor was a head of a calf full of maggots. The hooks were clean, but over the rack was an old piece of liver with the gall bladder in a mouldy condition.

One slaughter-house in part of a small barn has a cobblestone floor, with some cement poured over them. Plenty of holes through side for ventilation. Some blood about the sides but floor and surroundings in a fair condition. No refuse lying about.

A slaughter-house back of a residence about 600 to 700 feet from the road. Refuse about the building was all covered with straw manure and sprinkled well with lime. Not much odor.

The building is of wood. Quite a little dried blood on floor and trough, but well sprinkled with lime. Sides and over head quite dirty. Knives far from being clean.

MOOERS

Slaughter-houses are kept as well as can be with unpaved yards and wooden pens and platforms. Offal is thrown into the pens and the odor is offensive.

NIAGARA

Slaughter-house is a barn; yards and pens in bad condition. Lighted by lamps. Ventilation good. Meats handled in unsanitary manner.

ONEONTA

Two slaughter-houses. One is a wooden building, used both as a slaughter-house and a fat-rendering establishment. Place so offensive inspector could not enter the rendering department. The concrete floor of the slaughtering room was fairly clean.

The other slaughter-house is simply a wooden frame covered with wood. No fixtures or tables.

OXFORD

One slaughter-house. Building is unclean and offensive. No provisions for flushing it. Little evidence of the use of water. Offal carried off and buried. There was an offensive odor from the building and its immediate vicinity from the decomposing blood and filth about the floor. Place was most unsanitary.

PHOENICIA

One slaughter-house is part of a barn, about fifteen feet square. The offal is eaten by the hogs. Handling of meat unsanitary. All houses just about the same condition.

POESTENKILL

All slaughter-houses in very bad condition, especially the slaughter-house located a short distance from the village of Poestenkill. It is old and dilapidated, wooden, no regard for cleanli-

ness. Nearly or all offal thrown in a hog yard adjoining, to be devoured by hogs. The floor, blocks and tables thick with dried blood and other refuse emitting a very disagreeable effluvia.

RICHFIELD

Slaughter-house has no pavement. Platforms clean, lighting good, ventilation good, work tables clean, utensils, etc., clean. Method of handling meat good. Yards are filthy with refuse and blood, legs, heads and intestines of slaughtered animals.

ROME

Four slaughter-houses. The yards and outside surroundings in good condition. Pens all needed cleaning. Platforms are all made of wood and are more or less soaked with blood. One slaughter-house is modern and up to date. It is in a sanitary condition.

RUSHFORD

The slaughter-house is a very old wooden building, under which the hogs run for shelter and where the hog trough is located. The hog yard is about thirty-two feet square, and they keep seventeen hogs in it. It has a mud bottom and the hogs are in mud about to their knees. The odor from the yard is terrible owing to decomposition of effluvia which the hogs have not yet disposed of. The blood runs into the trough for the hogs to drink. No pavements or pens, equipments limited; wash their hands in the kettle where they scald the pigs. There are droves of rats in the slaughter-house. The hog yard is very unsanitary.

SALAMANCA

One slaughter-house is in the town of Great Valley. Yards are sanitary; no pavements; pens and platforms sanitary; wooden buildings, good light and ventilation. Equipments satisfactory. Wooden trough empties outside above ground where some of the materials are eaten by hogs. Adjacent to where meat is hung is a room half full of bones. The odor is exceedingly foul.

The other slaughter-house is in the town of Salamanca. Yards, large piles of manure and many flies present; no pavements;

wooden floors; satisfactory lighting and ventilation. Equipment fairly clean.

SEARSVILLE

Five slaughter-houses.

No. 1. New barn, yard dirt, no pen or pavement; platform is barn floor. Double doors at both ends. Good light and ventilation. Work utensils kept clean and in good condition. Handling of meat is sanitary.

No. 2. Building is of wood, new and in good condition; plenty of light and ventilation. Premises in good sanitary condition.

No. 3. Clean and in good order. No pavement; good light and ventilation. Equipment, clean and sanitary. Refuse and blood is given to farmers to feed pigs.

No. 4. In good condition. Equipments, clean and sanitary.

No. 5. Everything in good condition. Blood and refuse fed to pigs in pen on premises.

SHERMAN

Slaughter-house in the village limits. Yard, pen and detention-room in good condition. Wooden building, wooden floor; trough outflow for blood into hog trough. Several hogs are kept in lot adjoining same which feed on the refuse from slaughter-house. Lighting fair, ventilation poor. Equipment limited. Meats left to cool in this room around which hangs hundreds of pounds of tallow, which is flyspecked and filthy in appearance; floor is blood stained. Boxes in which tallow is packed are blood soaked and covered with flies.

SOUTH OTSELIC

Slaughter-house is of wood; conditions of yard bad; tubs, carts and utensils filthy. Method of handling meats unsanitary. All the paunches, intestines, head, feet and blood, thrown into hog yard.

SYRACUSE

In one slaughter-house of the city there is no proper care of cleanliness. First floor used for slaughtering; filthy matter thrown into a tub which a man was using to wash down beef with. The floor was filthy and littered, covered with blood and foul matter.

UNION

Slaughter-house in good condition, except the yard, in which is a hogpen into which the offal is thrown.

VESTAL

One slaughter-house is in good condition, with the exception of the yard.

The other is very bad in regard to the yard. There is a hog-pen into which the offal is thrown, from which the odor is bad.

WESTFIELD

One slaughter-house, condition of yard good, clean and dry; condition of pen not so good. Frame building; good light and ventilation. Floor of pen contained considerable number of bones, and was very wet.

The other slaughter-house yards were in good condition. Pens in fair condition. No pavements or platforms. Frame building. Light by windows.

YEARLY REPORTS ON RENDERING AND GARBAGE WORKS

Barren Island

New York, *January* 26, 1907.

Dr. Eugene H. Porter, *Commissioner of Health, Albany, N. Y.:*

Dear Sir:— I desire to present to you the report of the conditions now existing at Barren Island, and a brief review of the work during the past year of 1906. At the same time please pardon long delay in forwarding this as the data desired could not be obtained until this date.

There are still four plants on the island.

First. "The Sanitary Utilization Company," which disposes of the garbage of the entire city.

Second. "Whites," which disposes of the dead animals and offal of Manhattan, the Bronx and Richmond.

Third. "McKeevers," which disposes of the dead animals and offal of Brooklyn and part of Queens.

Fourth. "The E. Frank Coe Company," manufacturers of fertilizers.

The Sanitary Utilization Company was in full operation up to May 21st, when on that afternoon they were destroyed by fire, making a complete wreck of their whole plant there except their boiler plant, which was saved. From May 22d to October 15th, the garbage of Greater New York was all sent to sea. On October 16th they started up their new plant, and have been since then taking all the garbage that formerly went to sea. The new building which is completed and being used is known as the Brooklyn Building. They have 104 digestors in this and are able to take care of 2,000 tons a day, and are now receiving on an average 1,500 tons a day. They have now nearly completed a new tankage house and new drying plant and a new engine-room; and they have under construction a new pumphouse and also the foundation laid for the New York building, which they expect to have completed within ninety days. They also propose to erect a cement chimney 17 feet in diameter and 275 feet high. This contract has been awarded, but the work has not been started. They think by

this height of chimney they will be able to carry up the gases so high that they will not interfere with the surrounding country. Connecting flues are to be run to the digestors and press building, also to the dryer plant, so as to remove all obnoxious odors in these buildings. In rebuilding this plant they continued to use the same process as they have been using for the past two years. The amount of garbage handled by them is as follows:

January 1st to time of fire, Barren Island, 110,420¼ tons.

May 21st to October 15, sent to sea, 124,883 tons.

October 16th to December 31st, Barren Island, 66,487¾ tons.

The plant of White Brothers has been kept up to the usual standard in cleanliness and the improvements made during the past year were the additional fire service and an extra pump; but they propose now to add 15 new digestors, 2 open presses and 3 sets of carriers for handling garbage from their boats. The amount of material received at this factory was about the same as the year 1905.

McKeever Brothers have made no improvements during the past year; but they have started adjoining their plant a building which they call a storehouse; but undoubtedly to be used after its completion as a rendering house. This building is to be fire proof, and during the course of the year they will undoubtedly remove the machinery from the present building into the new building, so as to have the same a more complete plant than the present one.

E. Frank Coe Co., have been doing very little business during the past year, and at the present time the corporation has returned to Mr. Coe the property down there and he proposes doing no business or making no improvements whatever until later in the spring provided the business will warrant him in doing so. During the mean time the only work done there will be to keep the acid plant from injury by keeping it in operation.

The conditions at the island are on the improve, and with the new buildings of the Utilization Company and the new improvement at McKeever's, with the perfect condition of White Brothers plant, and the perfect condition of the Coe Company plant, there will be within the next year a vast improvement on the island. There is apparently great notice of neatness and cleanliness during the last six months, and hope when the year rolls around for

1907 that nobody will have any complaints to make against any of the plants on this island. Yours very truly,

B. F. HAMILTON

Cheektowaga

Buffalo, N. Y., *January* 1, 1907.

Dr. Eugene H. Porter, *Commissioner of Health, Albany, N. Y.*:

The American Agricultural Chemical Company's plant as to the physical operations of their factory, namely the equipment as to buildings, machinery, etc., have not expended anything for improvements for the past year, they remain the same as heretofore.

They continue to operate in the same way as regards to utilization of all tank and liquor water, and the prevention or destroying, as far as possible, of all odors, all of which I have reported to you from time to time.

The approximate quantities of stock handled the past year are as follows: Eight million pounds of butcher-shop fat, bones, etc.; 2,050,000 pounds (10,250 head), horses, cattle, sheep and hogs; 9,500,000 pounds of fresh slaughter-house carcass stuff, etc.; 5,000,000 pounds of miscellaneous material; 15,000 hides, skins, pelts, etc., and 25,370,000 pounds of dry merchantable tankage stock.

The Baynes Garbage Reduction Works have received and disposed of 50,195,300 pounds of garbage during the past year. The maximum quantity received in any one day was 295,690 pounds on September 19th, and the largest tonnage in any month was 6,406,440 pounds in the month of September.

Their motive power and equipment for the sanitary disposition of the garbage consists of four steam boilers of 125 horse-power each, as usually rated. They employ five steam engines, ranging from 12 to 75 horse-power each to drive the machinery and furnish the necessary electric lighting on the premises and in the buildings.

Their equipment for the utilization of the garbage consists of twenty-one rotary cylindrical dryers and four extractors with their applicances for the separation of the grease.

Their condensing appliances consist of two steam pumps, and the average consumption of water for such purpose amounts to 100,000 gallons per day.

They have kept their plant up to the standard of efficiency, hav-

ments and repairs as suggested from time to time in conducting their business.

The capacity and equipment of their plant has proven amply sufficient to promptly and efficiently utilize the largest tonnage of material received at any time during the year in a satisfactory and sanitary manner.

The Buffalo Fertilizer Co. plant, owing to the enormous growth in their fertilizer department, found it necessary to increase the capacity of their fertilizer building to the following dimensions: Width 178 feet, length 389 feet, making the building 338 feet wide and 1,139 feet long; with the building as enlarged, they are capable of turning out 60,000 tons of fertilizer annually.

In their naphtha plant they have treated 5,200 tons of tankage and extracted 1,439,117 pounds of grease.

They have disposed of 5,308,233 pounds of tallow, hog grease, tankage and bone in the past year.

The rendering plant consists of five tanks, three coolers and a dryer, the capacity of which is eighteen tons of tankage and fifty tierces of grease daily.

The grease extracting plant is equipped with two tanks and all modern appliances giving the department a capacity of twenty tons of tankage and twenty tierces of grease daily.

The Buffalo Reduction Company have built an extension to their rendering plant costing $5,500, and they have completed their new storehouse at a cost of $2,000 and erected sanitary improvements costing $700, making a total expenditure of $8,200 for improvements in the past year.

They have manufactured in the past year 447,644 pounds of grease and tallow and 1,898 tons of tankage.

They have not kept their plant in as clean a condition as they should have kept it for some time owing to putting up their new buildings, but as soon as they get them completed, they will keep things in a more sanitary condition.

All in all, the different plants have been run in a satisfactory manner for the past year and I have had few complaints, and when I did have a complaint, I immediately investigated and had the nuisance stopped, and I hope that you will feel satisfied that everything pertaining to the State Board of Health at Cheektowaga is in a satisfactory condition, while I remain,

Yours obediently,

DIVISION OF SANITARY ENGINEERING.

[605]

DIVISION OF SANITARY ENGINEERING

ALBANY, N. Y., *February* 1, 1907.

Dr. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit herewith the report of the work of the division of sanitary engineering for the year 1906:

During the early portion of the year, from January to April, the work of the division was under the direction of Prof. Olin H. Landreth, former consulting engineer. From April to August 7th the work of the division was temporarily in charge of one or both of the assistant sanitary engineers of the division, Mr. H. B. Cleveland, who was appointed inspecting engineer December 13, 1905, and assistant sanitary engineer May 28, 1906, and Prof. H. N. Ogden who was appointed assistant sanitary engineer July 13, 1906. On August 1st the writer was appointed consulting engineer to the Department, and from this date the work of the division has been under his direction.

The work of the division at the present time covers so large a field of general and special investigations that a definite classification of it is difficult. I have, however, for simplicity of description, somewhat arbitrarily classified the work of the division under the following headings:

I. Sewage and sewage disposal.
  - *a.* Examination of plans for sewerage and sewage disposal.
  - *b.* Other investigations relating to sewerage and sewage disposal.
  - *c.* Preparation of plans for sewerage and sewage disposal of State institutions.

II. Protection of public water supplies.
  - *a.* Examination of water supplies.
  - *b.* Preparation of rules for the protection of water supplies.

c. Inspections of violations of rules for the protection of water supplies.

III. Investigations of pollution of streams.

a. Examination of specific sources of stream pollution.

b. Systematic examination of sources of stream pollution by watersheds within the State.

c. Preparation of State sanitary map, showing sources of water supplies and of stream pollution.

IV. Investigation of public nuisances not arising from stream pollution.

V. Garbage disposal.

A brief description of the work done under each of these headings, arranged according to municipalities or localities within the State, will be given on the following pages. The custom adopted in former annual reports of transmitting all correspondence relating to each subject, will, however, be diverged from in this report in so far as that only such correspondence, engineering reports, and decisions of the State Health Commissioner, as may have an especial interest of a general or local nature will be submitted.

Respectfully yours,

THEODORE HORTON,

Consulting Engineer

I.

SEWERAGE AND SEWAGE DISPOSAL

I(a). EXAMINATION OF PLANS FOR SEWERAGE AND SEWAGE DISPOSAL

Amsterdam

On May 5th plans for certain extensions to the sewer system of Amsterdam were submitted for approval. Following a conference between the Commissioner and a committee from the sewer board of Amsterdam, the following communication was addressed to the mayor:

Albany, N. Y., *June* 5, 1906.

Hon. Jacob H. Dealy, *Mayor, Amsterdam, N. Y.:*

Dear Sir:— Pursuant to the conversation had in my office yesterday regarding the exact scope of the requirements and conditions under which a permit would be granted for the city of Amsterdam to construct additional sewers for the city, and sewer directly in the Mohawk river without treatment, I would say that the plans for the proposed extension will be approved and a permit granted to discharge directly into the Mohawk river, under the following conditions:

I. A permit will be granted for a period of five years, provided the city of Amsterdam shall, within three years, acquire title to land upon which to erect a sewage disposal plant and actually begin to construct a sewage disposal plant to treat the sewage of the entire city; and that said plant shall be put in operation within the five-year period.

II. The permit is to be accepted by the proper authorities of said city of Amsterdam by resolution duly passed, on the terms and conditions under which it is granted.

III. The permit is to be revocable at any time by the said Commissioner of Health, or subject to modification or change if the terms and conditions upon which it is granted are not being complied with, or the interests of public

VI. In the absence of full data, it would seem that sewers in certain localities are too shallow.

VII. Ground water drainage, a very important sanitary improvement, would be imperfectly accomplished by the system proposed. A gravity system would afford such drainage and such gravity system would deliver considerably less sewage, or rather sewage augmented by ground water, to the disposal plant.

VIII. The cost of pumping and maintenance of pumping machinery, as well as the reliability and continuous efficiency of such a method of carrying sewage to the disposal plant, are unquestionably matters of great uncertainty and only serious constructive objections to a gravity system would warrant the selection of a pumping system.

Except for the defects in this system as indicated above, and considering only the sanitary effect of the sewer system and its method of disposal, we find the system of sewers properly designed and calculated to furnish the city with adequate sewerage facilities. We desire to reiterate again that the cost of installation of this system is smaller than in the so-called gravity system, but that the cost of maintenance will be high and constantly increasing, both from the increase in volume and from deterioration of the machinery.

The sanitary value of the system being assured, as we believe, by this design, the selection of the plan for sewering the city is a matter, it seems to us, that should be decided by the citizens of Batavia, choosing between the gravity plan already approved, involving a larger and uncertain original outlay with better soil drainage and small maintenance charges, and between the pumping system, involving a smaller original outlay with, however, large maintenance charges and with uncertain continuance of operation.

Respectfully submitted,

H. N. OGDEN,
H. B. CLEVELAND,
Assistant Engineers

ALBANY, N. Y., *July* 24, 1906.

MR. J. H. WOOD, *Secretary Sewer Commission, Batavia, N. Y.:*

DEAR SIR:— I am returning to you to-day by express the plans for a general sewer system and sewage disposal plant for the village of Batavia, prepared by Alexander Potter and adopted by your board and sent to this Department for its approval.

I desire to call the attention of the sewer commission and, through them, of the people of the village of Batavia, to the facts in this case.

After these plans had been referred to the Consulting Engineer of this Department for his examination, he reported to me that the State Board having approved a comprehensive plan for a separate sewer system for the village of Batavia, including a gravity outlet sewer to the east, on March 8, 1895, which system provided for the discharge of the sewage by gravity into a tributary of the Genesee river and also included a site for a disposal system; and that subsequently, and on August 1, 1902, the State Commissioner of Health approved a set of detailed plans for a sewage disposal system which also included the operation of the plant by gravity without pumping; and,

That, therefore, there being an official set of plans which had already been approved by the State Department of Health, it would be advisable to have a critical comparison of the two plans made to ascertain the representative merits of the two systems and to determine their general suitability, both from an economical and a sanitary standpoint.

The plan submitted by your commission, which I am to-day returning to you, differs from the plan above mentioned in the following material respects:

1. Instead of discharging ultimately into the Genesee river, this system provides for a discharge into Tonawanda creek; and,

2. Instead of being a gravity system, as is the original plan, this plan provides a series of pneumatic lifts, by which the sewage flowing to a number of substations, is proposed to be lifted automatically by the aid of compressed air to such higher levels as to permit it to flow either to the next station or to the disposal plant.

It appearing to me, therefore, that there was some controversy among the advocates of the two systems as to the respective merits of the plans, I deemed it advisable to have such a critical examination made and subsequently returned to you the plans, together with the copy of the report of the Consulting Engineer, giving the result of his examination of the plans, and calling your attention to the mistakes and omissions in the Potter plans as outlined in his report, and suggested that, if accepted by you, the plans should be corrected in those particulars.

The principal objections to the Potter plans were pointed out in his report under the heads of omissions, mistakes and defects, and a copy of this report having already been sent you I deem it unnecessary at this time to go into detail regarding the matters referred to under these respective heads. It appears, however, that the Consulting Engineer raised objections to the size of the sewers and the fact that the septic tanks were to have no roof over them and the design of the disposal system with reference to its future extension; also to the shallow depths of the sewers, and made a careful comparison of the two plans with reference to the mileage, average depth and subsoil drainage, and also a financial comparison of the two systems as well as a comparison as to general suitability and reliability, in which he said that —

"Compared with respect to the permanence and certainty of action of the pipe system, flush tanks and disposal works, the Holmes and Potter systems are substantially equivalent. As to the relative suitability of the two sewage disposal sites proposed, either location appears to have certain advantages and objections, which leave in my opinion no material outstanding superiority for either."

He then points out that the most important and radical difference in the two plans and the one which affects in the most important degree the reliability of the two systems, is the manner in which the sewage after entering the sewers is conveyed to the disposal works,— as in the Holmes plan, sewage falls by gravity, while in the Potter plan the sewage is lifted. Your attention is, however, directed to the conclusions arrived at in this report, which I do not deem it necessary for me to comment on at this time.

Subsequently the sewer commission, together with Mr. Potter, returned the plans to this Department, accompanied by a report from Mr. Potter to the sewer commission, discussing the report of the Consulting Engineer of the Department to which I have already alluded.

Since that time one of the engineers of the Department has visited Batavia and has gone over the ground, and both engineers at present in the employ of the Department have gone over the matter carefully and examined the plans and both reports, and have made a joint report to me which is herewith enclosed to you and made a part of this communication.

I would recommend that this report and the defects in this plan noted therein receive the careful consideration of your board and of the people of the village of Batavia; but, inasmuch as the report shows that, except for the defects indicated therein and considering only the sanitary effect of the sewer system and its method of disposal, the engineers find the system of sewers properly designed and calculated to furnish the village with adequate sewerage facilities, I have decided to approve these plans and to leave the question of a choice between the gravity plan and the pumping system to the people of Batavia for their decision.

Therefore, in view of all the facts in this case, which I have set forth briefly above, and after giving due weight and careful consideration to the same and having gone thoroughly over the matter with the assistance of each engineer in the employ of the Department, I have decided that in this particular case and without in any way establishing a precedent, which I shall feel will govern my actions in future cases of this kind, I submit the approved plans, together with the report previously sent you and the joint report of the two inspecting engineers, herewith enclosed, to the people of Batavia to permit them to choose as to which design they wish to install, and I would urge their careful consideration of all the points involved before they act in this very important matter.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

On July 24th a permit was issued by the Department to the sewer commissioners of Batavia allowing the discharge of effluent from a village sewage disposal plant into Tonawanda creek, subject to the usual conditions of such permits.

BINGHAMTON

During the year plans were approved and permits for discharge subject to certain conditions issued for extensions to the sewer system of the city of Binghamton in the following streets: Chenango, Thorp, Holland, Mitchell avenue, certain streets in the Fifth ward, Maple, Prospect, Mygatt, Parsons, Mason avenue, Rogers and Crandall.

BRONX VALLEY TRUNK SEWER

On November 8, 1906, plans for a trunk sewer for the relief of the towns and villages of the Bronx river valley in the county of Westchester were presented to the Department for approval. This sewerage project is one of the longest and most important matters that have been before the Department and its full consideration has occasioned a careful examination of the plans and a full review of many factors of both sanitary and legal nature which were involved.

A joint hearing was given before the State Engineer and the State Commissioner of Health on Friday, December 7, 1906, to all parties interested in favor of, or against, the proposed trunk sewer. After a careful consideration of the evidence thus presented, of the decision of the Attorney-General as to the scope of the authority of the State Engineer and the State Commissioner of Health in passing upon these plans and the report of the Consulting Engineer of the State Department of Health, the plans were finally approved on December 27, 1906.

Reports and other correspondence follow:

ATTORNEY-GENERAL'S OFFICE,
ALBANY, N. Y., *December* 13, 1906.

Hon. EUGENE H. PORTER, *Commissioner of Health, and* Hon. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor, Albany, N. Y.:*

DEAR SIRS:— This Department is in receipt of a communication, under date of December 10, 1906, from Hon. Eugene H. Porter, relative to a sewer in the county of Westchester, known as the Bronx Valley Sewer. This office is asked for an opinion as to whether the State Commissioner of Health has authority to withhold his approval of the plans for the construction of this sewer until some provision has been made for the disposal of the sewage, and also whether the commission, having the construction of this sewer in charge, has authority, under chapter 646 of the Laws of 1905, authorizing its construction, to provide for a sewage disposal plant; and also whether the State Engineer and Surveyor and the State Commissioner of Health have authority to attach their approval to the plans as they now exist, which plans provide for a sewer discharging into the Hudson river.

The State Engineer and Surveyor refers the matter to this office for an opinion as to whether he is authorized to attach approval to the map and plans for the construction of this sewer without detailed specifications and estimates of the probable cost thereof in such detail as to enable him to form an intelligent opinion as to whether the proposed work can be constructed within the limits of expense specified in the act herein referred to.

I treat these two requests as a single communication in view of the fact that each of these officers is required to attach his approval to the map and plans before the work of construction can be entered upon.

This sewer is proposed to be constructed under the authority conferred by chapter 646 of the Laws of 1905, entitled an act

"To provide for the construction and maintenance of a sanitary trunk sewer and sanitary outlet sewer in the county of Westchester, and to provide means for the payment therefor."

It is contended by certain citizens in the city of New York that the discharge of this sewer into the Hudson river will con-

stitute a menace to the public health of the citizens of that city, and will have a tendency to injure the navigation of the waters of the harbor of New York.

Also that sections 75 and 76 of the Public Health Law prohibit the discharge of sewage into any waters of the State without the certificate of the State Commissioner of Health permitting such discharge, and that in view of the large area to be drained by this sewer he ought not to issue his certificate granting permission therefor without providing therein for a sewage disposal plant.

Chapter 646 of the Laws of 1906 seems to have taken the construction of this sewer out of the general provisions of the Public Health Law.

Section 1 of that act provides that

"The Commissioners (herein named) shall have the right, power and authority to acquire, hold and use all such property * * * as may be proper or necessary and shall have all other powers proper or necessary to carry out or effectuate the purpose of this act."

Section 2a of the act provides:

"It shall be the duty of said commissioners to * * * do all things necessary to the preparation, for the construction and completion of a sanitary trunk sewer from the northerly line of the town of White Plains at or near the Bronx river in the county of Westchester, thence southerly along the Bronx river, in or through the towns of White Plains, Greenburgh, Scarsdale, Eastchester and the cities of Mount Vernon and Yonkers, to or near the southerly line of the city of Yonkers; and of an outlet sanitary sewer, from thence westerly through the city of Yonkers *into the Hudson river*. The sanitary outlet sewer, if it be a sewer tunnel, extending westerly along the southerly line of the city of Yonkers, from the trunk sewer in the valley of the Bronx river, shall extend to a point in the city of Yonkers *in the Hudson river* at least to the bulkhead line in said city established by the United States War Department of 1897."

It will be observed from the language used in this section that the commencing point of this sewer, its general course and its definite point of outlet into the waters of the Hudson river are

specifically stated in the law. The point from which it is to start and the point not only at which it is to end is definitely stated, but the fact that it shall extend to a point *in the Hudson river* seems to preclude any thought on the part of the Legislature that there was to be a sewage disposal plant constructed as part of the work.

Provision is also made in section 14h for the common council of the city of Mount Vernon to have the use of the sanitary trunk sewer or the outlet sewer.

"For such other portion of the city of Mount Vernon as is now or may then be sewered by gravity to Eastchester creek through Mount Vernon's easterly outlet sewer, and not included in the sewerage area of the Bronx river * * * to permit such additional territory * * * to sewer into said sanitary or outlet sewer * * * to the Hudson river."

This language seems to be inserted in the act with the distinct idea that the sewage from this additional district was to be discharged into the Hudson river without any reference to a sewage disposal plant. It is true that the proposed sewer is described as a "sanitary trunk sewer and sanitary outlet sewer," but I am of the opinion that the word "sanitary," as used in the act, does not contemplate that the proposed sewer shall be constructed with a sewage disposal plant representing the highest development of the science of sanitary sewage. It is rather inserted for the purpose of designating this sewer as a house sewer in counter distinction from a storm sewer designed only to take surface water. A sewer designed for drainage only in the common acception of this term is not a "sanitary" sewer, while a sewer for general household purposes is commonly designated as a sanitary sewer. If, therefore, the Commissioner of Health is of the opinion that this proposed sewer is properly designed and will accomplish the purpose specified in section one of the act, namely, "preventing the pollution of the streams in the Bronx Valley in the county of Westchester, and preserving the health of the people of Westchester county," he has authority to approve of the map and plans without reference to the provisions of the general statute. If, in other words, the sewer is adequate to accomplish the usual purposes of a sanitary sewer for the area designated in

the act as well as the additional territory that may hereafter acquire the privilege of sewering into the same, he has the authority to approve unqualifiedly, and in my judgment cannot base his approval upon the condition that a sewage disposal plant shall be constructed in connection therewith.

The act provides in detail for a sanitary sewer and is silent with reference to a sewage disposal plant.

I am of the opinion that the State Commissioner of Health cannot travel outside of the provisions of this act and impose a condition not provided for in the act itself. It is the positive mandate of the Legislature that a sewer of the character described in the act constructed for the purpose specified in the act on the route mentioned therein and terminating into the waters of the Hudson river shall be constructed, and the province of the State Commissioner of Health, in affixing his official approval to the map and plans thereof, is to certify that such a sewer will accomplish the purposes stated in the act.

With reference to the duty of the State Engineer and Surveyor in approving of the map and plans for this work:

Section 2d of the act provides as follows:

"After * * * * a new map or plans shall be filed in the places designated above * * * * and before the actual construction of such a sanitary sewer, said final map and plans shall be subject to the approval of the State Engineer and the State Board of Health, and contracts shall not be let nor shall work be taken * * * * until the said final map or plans shall have been approved by the State Engineer and the State Department of Health."

It will be observed that it is the "final map and plans" that are to be submitted to the State Engineer and the State Commissioner of Health. No reference is made in the act to detailed specifications and estimates. It is true that section 8 of the act provides:

"No contracts shall be awarded for one section of this sewer, until estimates have been received for all sections, so that in no event the limit fixed by this act as to the cost of the total work shall be exceeded."

But the act makes special provisions for engineers who are to have the general charge and supervision of the preparation of

these plans and who must make estimates, and of course as part of their professional work, detailed specifications. These specifications and estimates are not required to be submitted to the State Engineer. A map is a profile of the country with the route of the sewer indicated thereon.

A plan is a draft or form of representation of a horizontal section of anything, as of a building or machinery. Its synonyms are "draft," "delineation," "sketch" and "design."

"Words and Phrases," volume 6, page 5399.

"SPECIFICATIONS, as understood by the provision embraced not only the dimensions and mode of construction, but the description of every piece of material, its kind, length, breadth and thickness, and the manner of joining the separate parts together. They are an accurate description of the materials and work to be used and performed in the execution of the work. They involve a detailed statement of the various elements involved in the plan of the building or structure."

"Words and Phrases" volume 7, page 6459.

It will thus be seen that the Legislature has left to the engineers charged with the duties of preparing these maps, plans, specifications and estimates all of the detailed work usually embraced within the phrase "specifications," and that before contracts are made these must be present and must show certain results while the Legislature, with equal care, has said that the general map and the general plans shall be submitted to the State Engineer and the State Commissioner of Health for their approval.

This clear distinction between the plans and specifications was apparently designedly made by the Legislature when defining what the State Engineer and what the State Commissioner of Health should approve.

I am of the opinion, therefore, that the State Engineer and the State Commissioner of Health are not required to express by their approval any opinion as to whether the work can be constructed within the amount specified in the act, and that they are not called upon to consider specifications and detailed estimates, but are only required to express, by their approval, their judgment that the work specified in the act can be performed

and the results therein enumerated attained by the general plans and general map placed before them for their approval.

Yours very truly,

DANFORTH AINSWORTH,
Deputy Attorney-General in Charge

ALBANY, N. Y., *December* 17, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR:— I beg to submit herewith a report upon my examination of plans for the proposed Bronx valley trunk sewer, which at the present time are before the Department for approval.

Progress reports have already been submitted under dates of November 27 and December 7, 1906, in which attention was called to lack of necessary information and data for a complete examination and consideration of these plans. The insufficiency of the data which were originally submitted with the plans resulted from a failure to submit an engineering report with the plans, it being explained, however, that, since the work of the Engineering Department of the Bronx Valley Commission was so closely associated with that of the Commissioners, no such report was prepared nor considered necessary. Through subsequent correspondence and personal visits, however, this desired information has been obtained so that a complete report upon these plans can at this time be submitted to you.

History of Bronx Valley Sewer Project

The subject of a trunk sewer for the relief of the Bronx valley has been under consideration for a number of years. It was made the subject of a special investigation and report in 1895, when plans were prepared by J. J. R. Croes and J. J. Fairchild, Engineers, showing a trunk sewer on approximately the same route as the present one, as far down the valley as Mt. Vernon. Below this point the sewer was continued along the Bronx river for some miles and was then led easterly across low marsh area to a point of discharge into the tidal currents of Long Island Sound. This project differed essentially from the present one

only in the location of the point of discharge. The project was at that time defeated, however, and nothing further has been done since to revive it upon lines laid out by that Commission.

In 1904, about ten years later, the question was made the subject of another investigation and report by a Commission appointed in that year, and as a result of the work and recommendations of this Commission to the Legislature, an act was passed (chapter 646 of the Laws of 1905 of the State of New York) to "provide for the construction and maintenance of a sanitary trunk sewer and sanitary outlet sewer in the county of Westchester and to provide means for the payment thereof."

This act designates specifically the area within the different townships adjacent to the Bronx river which shall be provided for by the proposed trunk sewer, as well as the route of the sewer and the point where the sewage of the "sanitary sewer outlet" shall discharge, viz. into the Hudson river. It is owing to the specific requirements of this act in regard to the point of discharge that no routes for this sanitary sewer outlet other than the Hudson river have been studied by the present Bronx Valley Sewer Commission.

Plans Submitted for Approval

The plans submitted to you by the present Bronx Valley Sewer Commission in accordance with section 2-d of the Bronx Valley Sewer Act (chapter 646 of Laws of 1905) include a general map of assessment districts and plans, profiles and details of the trunk sewer. The plans submitted are as follows:

1. One general plan of district showing boundary of assessment districts and general route of the trunk outfall sewer.

2. One set of seventeen plans showing location of Bronx valley sewer through towns of White Plains, Greenburgh, Scarsdale, Eastchester and the cities of Mt. Vernon and Yonkers.

3. One set of seventeen profiles corresponding to said plans.

4. One set of four plans showing location of outlet sewer through city of Yonkers, Westchester county.

5. One set of four profiles corresponding to said plans.

6. One set of eight sheets of typical sewer sections and detail drawings.

Description of Bronx River Valley

The valley of the Bronx river occupies a narrow strip of land, some twenty-five miles in length, having a width ranging from about one-half to two and one-half miles, lying in the county of Westchester and the city of New York with axis parallel with the Hudson river. The Bronx river, which traverses the valley, rises in Westchester county in the town of Newcastle and flows southerly through Westchester county and New York city and discharges at tide water into East river, between Hunt's Point and Clason's Point.

The portion of the river within Westchester county, through which it flows for a distance of eighteen miles, forms the boundaries between Yonkers, Greenburgh and Mt. Pleasant on the west and Eastchester, Scarsdale, White Plains and North Castle on the east. The territory drained by the river is about fifty-six square miles, of which forty-eight square miles is in Westchester county. About twelve square miles of the upper portion of the watershed have been appropriated by the city of New York for its water supply and about four and one-half square miles have been taken by the city of Yonkers for its water supply.

Since only the surplus rainfall from this appropriated area used for the New York water supply is discharged into the river below the reservoir dams, the drainage area contributary to the flow of the river at the Westchester county line for the greater portion of the year is only about thirty-one and one-half square miles, and at its outlet at East river about forty square miles. The summer flow from this draining area is probably not greater than two cubic feet per second at the Westchester county line and two and one-half cubic feet per second at its outlet, quantities which may be considered insignificant for purposes of disposal of sewage for a district such as the one under consideration.

The fall of the river north of White Plains is about 8.5 feet per mile. From White Plains to Bronxville it is about fifteen feet per mile. From Bronxville to Woodlawn the fall is about five feet per mile. From Woodlawn to Bronx Park the fall is only two feet per mile. Below this point the river falls very rapidly at the rate of thirty-one feet per mile to Tannery dam at West

Farms, below which point it is tidal. There have been constructed dams along the river below the dam at Kensico, some ten or twelve dams ranging from four to twenty feet in height, which create ponds and slack water in many cases for considerable distances above them.

Present Pollution of Bronx River

The territory included within the Bronx valley sewer district lies wholly within Westchester county and comprises parts of the cities of Yonkers and Mt. Vernon, portions of the towns of Eastchester, Scarsdale and Greenburgh and the villages of Tuckahoe and White Plains. The estimated present total population within the district is about 30,000, classified according to villages and hamlets with contiguous population as follows:

White Plains	12,800
Hartsdale	1,700
Scarsdale	1,800
Yonkers Park	700
Tuckahoe	2,300
Bronxville	1,500
Mt. Vernon	4,300
Yonkers (fifth and seventh wards)	4,900

At the present time Hartsdale, Scarsdale, Yonkers Park, Tuckahoe and the fifth and seventh wards of Yonkers have no established sewer systems, the people of these places being served by cesspools or small private disposal plants. The village of Tuckahoe has under construction a separate system of sewers about five miles in length, the sewage from which after septic tank treatment will discharge into Bronx river without further treatment.

The village of White Plains has a complete sewerage system, the sewage from which is treated at chemical precipitation works having a capacity for less than one-half the population now served by it, and is then discharged into the Bronx river.

Bronxville is provided with a system of about five miles of private and public sewers, the sewage from which is treated in a septic tank and then discharged into the Bronx river.

The sewage from the portion of Mt. Vernon with the Bronx

sewer district is collected through a system of several miles of sanitary sewers in a receiving reservoir on Mt. Vernon avenue, from which it is pumped across the divide and discharged without treatment into Eastchester creek.

It is thus seen that the sewage of White Plains and Bronxville with a combined population of over one-half the total population of this district, but to which will be added in the near future the sewage of Tuckahoe with a population of over 2,000, is now discharged into the Bronx river with partial purification which, in the light of present general knowledge of septic tank treatment and with the more specific knowledge of the overtaxed capacity of the White Plains chemical plant, at best cannot have an efficiency greater than 50 per cent. In addition to this there is a considerable amount of crude manufacturing sewage entering the Bronx river, the volume of which was estimated by the late J. J. R. Croes, Chief Engineer, some ten years ago, to be probably greater than the low summer flow of the stream.

On the basis of domestic sewage alone and the assumption of 50 per cent. efficiency of treatment, which is undoubtedly high, the diluting capacity of the Bronx river to dispose of sewage without a nuisance is, during the summer season, overtaxed some twelve times and in all probability some fifteen to eighteen times.

It is hardly necessary to emphasize further the evidence in regard to the gross pollution which now exists generally, and especially in summer time, along the Bronx river below White Plains unless, perhaps, to state that the sanitary condition of the river has been made the subject of a number of special investigations and that every reliable observer has pronounced the river to be grossly polluted, and, at times, an offensive nuisance.

As to the future sanitary condition of the Bronx river in case relief is not soon provided, it may be said that the district provided for by the Bronx valley sewer, notwithstanding the retarding influence of unsanitary sewerage facilities in the past, is at the present time a rapidly growing one. Owing to the picturesque and other advantages of this section of Westchester county for suburban residential life for New York city, and the rapidly improving and increasing railroad facilities now in progress, an unusual increase in population may naturally be expected in the

future. The inevitable result will be that unless adequate provision for sewerage is now taken in advance of this expected growth the sanitary conditions along the Bronx river, which are now so objectionable, may become almost intolerable.

Adequacy of the Proposed Bronx Valley Sewer for Relief of Municipalities in the Bronx Valley Sewer District

The plans submitted have been carefully examined and studied with respect to both engineering design and the question of sanitary disposal of sewage. A trip was made over the route of the proposed sewer, the tunnel line and the point of discharge into the Hudson river. A careful inspection was also made of possible sites for sewage purification along the route of the sewer with a view to a more comprehensive understanding of the suitability of the method of disposal provided for in the Bronx Valley Sewer Act.

In regard to the design of the trunk sewer, such questions as relate to future growth and population of the district, and subdivision thereof, per capita allowances, absolute capacities of the trunk sewer, relative capacities as compared with tributary populations at various points, suitable cleaning velocities and other questions of an hydraulic and structural nature relating to design and operation, were carefully considered. With respect to these engineering features, no criticism can be justly made of the plans as submitted if rational consideration is given to the uncertainties of some of the questions involved, such as the distribution and density of growth of the district in the future, the inclusion or exclusion of certain areas as provided for in the act, and the possibilities of supplementary partial purification at some time in the future.

In regard to the method of sewage disposal proposed, it should be said at the outset that the Bronx Valley Sewer Act specifically provides for " an outlet sanitary sewer through the city of Yonkers to the Hudson river."

The act further provides that " contract shall not be let nor shall work be begun under the said final map or plan until such final map or plan shall have been approved by the State Engineer and the State Department of Health." In view of the possible

incompatibility of approving plans under these two provisions the matter was referred to the Attorney-General, and on December 12th the following decision was given, viz.: "That the State Engineer and the State Commissioner of Health are not required to express by their approval any opinion as to whether the work can be constructed within the amount specified in the act, and that they are not called upon to consider specifications and detailed estimates, but are only required to express, by their approval, their judgment that the work specified in the act can be performed and the results therein enumerated attained by the general plans and general map placed before them for their approval."

This decision evidently limits the scope and province of approval of these plans by the State Engineer and the State Commissioner of Health, but, in view of the fact that one of the "results therein enumerated," according to section 1 of the act, is the "prevention of the pollution of the streams in the Bronx valley in the county of Westchester and the preserving of the health of the people of Westchester county," I have considered carefully, from a sanitary standpoint, the method of disposing of the sewage in accordance with the proposed plans and the provisions of the act, and also the practicability of a sanitary disposal of the sewage by some method of purification at treatment works located within the Bronx sewer district.

In regard to the disposal of sewage by dilution through a sanitary outlet sewer through the city of Yonkers into the Hudson river, we may say in general that the successful disposal of sewage into tidal waters is a matter which depends primarily upon three factors, viz.: Dilution, dispersion and digestion, and the successful solution of any particular case can usually only be determined after a series of observations and careful studies of an engineering, chemical and biological nature.

It is essential, for instance, in regard to dilution, that the volume of water is not only sufficient in amount but is effective in diluting the sewage. Again, in regard to dispersion, it is essential that the currents be swift enough to break up the sewage flow and rapidly disperse it, so that at a short distance from the point of discharge it is not discernible to the sense of sight or

smell; and that the direction of the currents, as well as the prevailing winds, are such as will not cause the coarser suspended or visible matter being stranded upon adjacent shores. Finally in regard to digestion, it is essential that there is an ample supply of life in the form of bacterial and even higher organisms to admit of complete oxidation and assimilation as food of the volume of sewage that is poured into them.

These three influences or factors are so closely associated and interdependent, and the changes in them from day to day and season to season are so variable that, as suggested above, it is practically impossible to anticipate in advance what conditions will result in any particular case without a careful and extended investigation. Such an investigation should, in general, include a series of observations with respect to the three factors above mentioned, such as:

1. Measurements and calculation to determine the volume of tidal water available for dilution under all stages of the tides, including a study of the volume of water added by the Hudson river at various seasons.

2. A series of float observations covering all stages of the tide to show the distance to which the sewage will be carried up and down the Hudson river, the extent to which coarser matter may be drifted along the shores and the rapidity of dispersion of the sewage.

3. Chemical and biological observations to determine the quality of the water of the Hudson river to satisfactorily dispose of by digestion the volume of sewage that will be discharged into the river when the sewer is completed, and in the future when the estimated population of 850,000 persons will be contributing sewage.

The above will perhaps indicate in a general way the point which I wish to emphasize in relation to this question of sewage disposal, viz.: That the question is one of considerable magnitude and importance and cannot be definitely solved without an extended study or investigation, one that, so far, has not been satisfactorily solved by the present Commission, nor by any other commission for the particular case of the Bronx valley sewer, and

one that is certainly beyond the satisfactory solution of this Department with its present organization and available funds.

Notwithstanding the desirability of having a thorough investigation made on lines above described and the impracticability of foretelling in advance with exactitude the extent or the effect which the discharge of the sewage from the proposed Bronx valley sewer will have upon the water of the Hudson river at the proposed outlet, there is sufficient evidence of a comparative nature with respect to other outfalls along the Hudson river and outfalls of other communities similarly situated with respect to tidal disposal of sewage, as well as a limited number of actual observations made during investigations of the New York Bay Pollution Commission, the New York Metropolitan Sewage Commission and the Commission for the New York Water Supply, to justify a conclusion that for many years to come the Hudson river at this point can satisfactorily dispose of the sewage of the Bronx valley sewer district without affecting the comfort and health of the communities situated along the river near the point of discharge. As to how long in the future the character and condition of the Hudson river will continue to dispose of the sewage which is being continually poured into it is a question which cannot be answered at the present time with the limited scientific studies that have so far been given to the question. The investigations of the New York Bay Pollution Commission indicate that the digestive capacity of tidal water of New York bay is sufficient to satisfactorily dispose of the sewage of the New York Metropolitan district for a period of at least twenty-five years in the future while similar investigations made by the Passaic Valley District Drainage and Sewerage Commission, with which the writer was officially connected, indicate an even longer period in the future.

The arrangement or method by which the sewage is discharged into any tidal water affects also materially the sanitary efficiency of disposal by dilution, and in this respect the proposed outfall is comparatively very favorable. Instead of terminating at the bulkhead line and discharging at approximately tide level, as is done with practically every outfall along this section of the Hudson river shore, the outlet of the Bronx valley sewer will be carried out to the pierhead line and be discharged through two outfall

pipes at an elevation some thirty-five feet below tide level. The effect of this will be to produce a better and more rapid diffusion, a better digestion of the sewage by the river water and a reduction or prevention of visual pollution along the river shore.

Ultimate Disposal of Bronx Valley Sewage

Although the sewage of the Bronx valley district can be satisfactorily disposed of by dilution into the Hudson river in accordance with the proposed plans in a satisfactory manner for many years to come there can be no reasonable doubt that, with the present increasing population of the New York Metropolitan district and a continuance of the present manner of disposal of its sewage by tidal dilution, the time will eventually come when the digestive capacity of the water of New York harbor will be reached and the present means of disposal be either discontinued or modified. Some consideration has already been given to this important question by the New York Bay Pollution Commission and the New York Metropolitan Sewerage Commission, but no satisfactory solution of it has as yet either been given, nor in fact, could be given, without a much more comprehensive investigation, covering perhaps years of observation and study, than has been yet undertaken.

Considering the growing tendency of the population in and adjacent to New York city to form a Metropolitan district with ownership of public works of a Metropolitan nature, it is reasonable to assume that any solution of the sewage disposal problem for New York city and adjacent municipalities, such as those of the Bronx district, which may at any time in the near future become a part of Greater New York, would and should be along lines of Metropolitan sewage disposal. This solution may prove to be best accomplished by methods of individual or combined sewage purification, or by a method of single or multiple lines of ocean disposal. The very uncertainties which are involved, however, are in my judgment sufficient to warrant no hesitancy in approving any method of sewage disposal for any community within the present or prospective New York Metropolitan district that is now and will be a satisfactory one until the time when a comprehensive scheme for sewage disposal for the entire district shall

be required; and one that is not different from those now practiced in this district nor requiring any different method of ultimate Metropolitan disposal, whatever this method may be.

It is possible, of course, that the problem of ultimate disposal may be most satisfactorily marked out by the method of purification at one or many treatment works, if available parcels of land favorably situated can be secured, and at a less cost than by ocean disposal. The question then arises as to whether suitable land can be secured in the future within the Bronx valley district for the treatment of the Bronx valley sewage and, if it can be, whether in view of the impossibility of providing for its purchase under the provisions of the present act, the plans should be disapproved. In order to determine the availability of any sites for purification works along the proposed trunk sewer, the route of which is definitely described in the act, which would beyond a question be free from any objection resulting from operation of treatment works or the disposal of sludge, I carefully inspected the entire route of the proposed sewer with a view of finding any sites that might fulfill these requirements.

Along the Bronx river I discovered two or three areas of sufficient size to properly treat the sewage of the territories that would be tributary to them. Purification plants located at any such places would, in my opinion, not be a satisfactory solution of the problem, since the effluents in such cases would have to be discharged into the Bronx river, which has too small a summer flow to prevent a nuisance being created by the discharge of effluents into it; or else these effluents would have to be discharged into a trunk sewer and again mingle with sewage contributed by localities situated further below on the line of sewer. Again the land throughout this section is valuable, and the sewage, if purified, would have to be pumped, both of which factors would result in relatively high cost of construction and operation.

At Mt. Vernon, just before the trunk sewer enters the tunnel, is an area adjacent to the river which is ample to provide purification works for the sewage which would be delivered at this point. This district, though not densely populated now, is a rapidly growing one, and whereas it is perfectly practicable to construct sewage purification works here and, if properly operated, might produce

no nuisance for a limited period in the future, I consider that the area is too small and centrally located, with respect to contiguous population, to permit purification works to be constructed and operated in a practicable and sanitary manner for as large a population as that estimated to be tributary at this point, viz., 680,000 persons.

The land along the line of the tunnel in the vicinity of Tibbits brook was also carefully inspected, the trunk sewer at this point having only a moderate cut. The valley at this point has precipitous slopes and, near the line of the tunnel, is from 400 to 500 feet wide. Although ample area for complete purification works is available here pumping would, however, be required. This part of Westchester county is, from an esthetic standpoint, a beautiful one and the line of the sewer is within 200 feet north of the line of Cortlandt park, a large reservation extending across the entire valley of Tibbits brook. It is possible, if not quite probable, that this park will be extended northerly in the future, which would mean that any purification works located at this point would be in park property. To what extent purification works, if constructed here, would preclude the purchase of this area for park purposes, or would depreciate the beauty and value of this land as a park, is hardly possible to estimate. Under present conditions, however, it is practicable to construct and maintain works for complete purification here should the esthetic question not preclude such a course. When, however, the time arrives for the treatment of the sewage of the whole population of 680,000 and for the sanitary disposal of the sludge from so vast a population, I consider it very questionable whether such works would not be more objectionable, and to perhaps a larger community, than the disposal of the same sewage into the Hudson river as provided for by the proposed plans.

At the Hudson river I found that, owing to the steep cliff adjoining the river and the New York Central Railroad, the land adjacent to the route of the sewer is very limited for purposes of sewage purification. A strip perhaps 60 feet wide and 250 or 300 feet long is all that was found available, and this area is unquestionably inadequate for complete purification works or for partial purification works by means of septic tanks or chemical precipitation.

Conclusions and Recommendations

We may then briefly conclude, in view of the foregoing, that:

(*a*) A serious condition of pollution exists along the Bronx river at the present time which demands immediate relief.

(*b*) The proposed Bronx valley trunk sewer adequately meets the present and future needs of the Bronx valley district according to the requirements of the Bronx Valley Sewer Act.

(*c*) The requirements of the Bronx Valley Sewer Act preclude a disposal of sewage by any other means than by dilution into the Hudson river.

(*d*) The State Engineer and the Commissioner of Health are, according to the decision of the Attorney-General, only required to express by their approval their judgment that the work specified in the act can be performed and the results therein enumerated attained by the general plans and general map placed before them for their approval.

(*e*) The method of disposal into the Hudson river by dilution, as provided by said act, is adequate for the sanitary disposal of the sewage of the Bronx valley sewer district for many years in the future.

(*f*) The proposed method of submerged multiple discharge outlets of the Bronx sewer is more sanitary than other sewer outlets of the cities of New York and Yonkers.

(*g*) The practicability of ultimately disposing of the sewage of the Bronx valley district without objection by means of purification is less than by the method of dilution into the Hudson river as provided by the act.

(*h*) A future joint disposal of sewage of all municipalities in the Metropolitan district presents the most feasible and consistent solution of the ultimate disposal of Bronx valley sewage.

In view of the above conclusions, I beg to recommend that the plans for the sanitary trunk sewer and sanitary outlet for municipalities in the Bronx valley be approved and that a permit be granted for the discharge of sewage thereof into the Hudson river in accordance with the act providing therefor, until January 1, 1915.

Respectfully yours,

THEODORE HORTON,

Consulting Engineer

Albany, N. Y., *December* 31, 1906.

Bronx Valley Sewer Commission, *White Plains, N. Y.*

Gentlemen:— We are returning to you to-day by express the approved plans for the so-called Bronx Valley Sewer, submitted to us for approval under the provisions of chapter 646 of the Laws of 1905.

Since the public hearing held on the question of the approval of these plans on December 7, 1906, we sought the advice of the Attorney-General as to the authority which we possessed and as to the duty imposed upon us by the provisions of the act providing for the construction of this sewer; and our approval is based upon and in conformity with the opinion of the Attorney-General, dated December 13, 1906, and in which he advises us as to the points in question.

One set of the plans is returned to you and duplicate set with approval attached has been filed here.

Very respectfully,

HENRY A. VAN ALSTYNE,
State Engineer and Surveyor

EUGENE H. PORTER,
State Commissioner of Health

Bronxville

On January 22, the Board of Trustees of the village of Bronxville submitted plans for extensions to the sewer system of the village.

Schenectady, N. Y., *March* 3, 1906.

Dr. E. H. Porter, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:— I beg to report as follows on my examination of the plans for the proposed extension of sewers in Lawrence Park, in the village of Bronxville, Westchester county, N. Y., which you recently submitted to me for examination.

Original plans for the Bronxville village sewer system were approved by the State Commissioner of Health on May 14, 1902, and will be found in the Twenty-Third Annual Report. These

plans provide for certain sewers in Lawrence Park, a residential portion of the village originally owned, laid out, and the streets and other public improvements of which were constructed by a private individual or corporation.

The system of sewers throughout the village, outside of Lawrence Park, has been nearly constructed, including the sewage disposal plant, and some of the sewers have been, as I understand, constructed in Lawrence Park by the Lawrence Park owner or corporation. This corporation or owner now proposes to deed to the village all the sewers in the Park, on the condition that the village make the connections necessary to attach their system to the main village system. The plans now submitted are intended for this purpose. It is to be noted, however, that the original plans approved in 1902, provide for such connection between the sewers of the park and the sewers of the village, but by plans different from those now submitted. The plans now before us, therefore, although not so marked, are in reality plans for changes in plans already approved.

These plans comprise the following:

1. A sewer map without contours, showing a portion of Pondfield road, Midland avenue, Tanglewylde avenue, Garden avenue and adjoining estates in Lawrence Park, on a scale of 100 feet to the inch; approved by the Board of Trustees on January 17th, and by the Board of Health on January 18th; on tracing-cloth, not in duplicate.

2. A sheet of sewer profiles, without title, signature or date; on tracing-cloth, not in duplicate.

3. A sheet of details of flush tank and typical manhole, without title, signature or date; on tracing-cloth, not in duplicate.

4. A sheet of details of "standard manhole," without title, signature or date; on tracing-cloth, not in duplicate.

5. A letter by the designing engineer, Mr. George H. Rogers, addressed to the Board of Trustees of the Village of Bronxville, dated January 15, 1906, giving certain descriptions as to the proposed sewers.

As a result of my examination of these plans, I beg to submit the following list of omissions, mistakes and defects, which should, in my opinion, receive further attention before approval of the system is given by this department:

Omissions

1. None of the drawings nor the report are in duplicate as required.

2. The drawings do not show by their titles or otherwise, that the plans submitted are to be substituted for others already offi cially approved. Neither do the drawings show the location of the sewer lines of the original system which are to be replaced.

3. The plans do not show the sewers which will ultimately be tributary to the present proposed sewers; nor is any information given as to the length of streets, or population, nor amount of sewage which the present proposed sewers must provide for.

4. No contours are shown for the ground surface, nor are street elevations or street profiles shown for a number of streets which must evidently be dependent ultimately on the present proposed sewers, but for which no sewers are now shown. It is therefore impossible to determine whether the present sewers will satisfactorily provide for the future sewering of these streets, or not.

5. The map and the report indicate that the overflow from three large cesspools which now furnish the means of disposal for the sewage of a considerable portion of Lawrence Park is to be tapped into the proposed sewers. Nothing is shown, however, to indicate the details of such overflow.

6. The profiles do not show the elevation of the lowest cellar bottoms along the several lines of sewers, and, as the map does not show contours, it is not possible to determine whether the sewers are deep enough to ensure satisfactory sewerage for all of the premises along the lines which may in the future be built up or may require sewerage. The shallow depth of considerable portions of the sewers as indicated by the profile, leads to the fear that such future satisfactory provision may not be possible.

7. The profile of the proposed sewer on Tanglewylde avenue, from the corner of Rose street to the corner of Park avenue and thence toward Midland avenue, is not shown; neither is the profile of the proposed sewer extension to the village north boundary shown.

8. The manhole shown on the profile at Tanglewylde avenue 150 feet north of Rose street is omitted from the map.

9. The invert elevation of the above manhole is omitted from the profile.

10. The sewer invert elevation at the manhole corner of Tanglewylde avenue and Tanglewylde place is omitted both from map and profile.

11. The manhole shown on map at the junction of the Tanglewylde avenue sewer with the outlet from cesspool No. 1 is omitted from the profile.

12. The manhole shown on profile of Tanglewylde avenue sewer at the junction, with the overflow from cesspool No. 1, into Midland avenue drain, is omitted from map.

13. The sewer invert elevation at manhole corner of Tanglewylde avenue and Garden avenue is omitted from the map.

14. No profile of Garden avenue nor of the Garden avenue sewer is shown; and no descriptions of the Garden avenue sewer as to size, rate of grade and invert elevations are given on the map.

15. The sewer invert elevation at the Vine street manhole on the Midland avenue outlet sewer is omitted from both map and profile.

16. The rates of grade of sewers are not marked on the map.

Mistakes

The invert elevation of manhole at junction of Tanglewylde avenue sewer and the sewer to replace present Midland avenue sewer or drain is marked 79.26 (in pencil) on the map, and 79.36 on the profile.

Defects

1. It appears from the drawings that cesspools Nos. 1 and 3 are to be allowed to remain and to receive sewage as heretofore, and to have the overflows only connected with the proposed sewer. If this is so, it is a defect which should not be permitted. Unless good reasons are offered for retaining them, the cesspools should be abandoned, filled up, and the pipe originally leading to them should be connected directly with the proposed sewer. It is understood that the sewage now entering cesspool No. 2 is to be entirely diverted into Tanglewylde avenue sewer. This is desirable, and the cesspool itself should then be filled up.

2. Several bends of sewer alignment occur at points without

manholes. All changes of direction, both vertically and horizontally, should be made at manholes.

3. Many sewers are shown by the plan to be too shallow to probably furnish satisfactory sewerage facilities to premises near them.

4. Only one sewer invert elevation is given at a majority of the manholes. This indicates that no drop or increase in grade is allowed through the manhole to provide for the increased resistance through the manhole.

5. The plans are not drawn in black ink alone. Colored ink is used on many lines.

The plans are herewith returned to you.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer

Albany, N. Y., *March* 6, 1906.

Mr. Ellis L. Gladwin, *President, Board of Trustees, Village of Bronxville, Home Life Insurance Building, New York:*

Dear Sir:— The plans for an extension of the sewer system of your village into Lawrence Park, have recently been submitted to this Department for approval under Section 260 of the Village Sewer Law.

An examination of these plans shows a number of omissions and defects, many of which are minor in character and can readily be rectified, while others are radical and more serious.

While I cannot therefore in justice to the interests of your people approve the plans in their present form, I will approve them as soon as the omissions and defects have been rectified, which are indicated in detail in the report of the Consulting Engineer of this Department, dated March 3d, a copy of which is herewith enclosed.

Trusting that this will enable you to carry out your intention of having this much needed improvement inaugurated at your coming election, I am

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

On March 14 the corrected plans were again submitted and on the same date were approved.

CATSKILL

On August 22 a plan and an application for a permit for a proposed outlet sewer from West Main street to Catskill creek were received by the Department.

On September 18 the plan was approved and the permit granted subject to revocation upon due notice from the State Commissioner of Health.

CELORON

CELORON, N. Y., *April* 12, 1906.

State Department of Health, Albany, N. Y.

GENTLEMEN:— As attorney for the village of Celoron I write you relative to the statement, that there is a private sewer located in the village of Celoron and extending into the outlet of Chautauqua Lake, owned by A. N. Broadhead and Wm. M. Lindsey which they are desiring to transfer to the village of Celoron. I have advised the board of trustees of the village (without looking the matter up, and in an offhand way) that I thought it would be necessary for them to obtain a permit from the State Board before it could be made a village or public sewer, although the use of the same will not be increased by said transfer.

May I ask you to take early action in the matter and advise me.

Yours truly,

ARTHUR H. HITCHCOCK

ALBANY, N. Y., *October* 10, 1906.

Mr. F. W. GOTTS, *Village Clerk, Celoron, N. Y.*

DEAR SIR:— With reference to your application to take over certain sewers in your village for the purpose of bringing them under the control of the municipal authorities, I have issued and am enclosing you herewith, as required by law, a permit giving you permission to discharge sewage from the said sewers for a limited period.

In the meantime, I would urge that the village board have plans made for an adequate system of sewers, including sewage disposal for the entire village.

The attention of the village authorities is called to the unsatisfactory layout of the present system of private sewers submitted with your application, and this permit is granted as a temporary expedient while plans are being prepared for an adequate system of sewers which can be properly extended to meet the requirements of the growth of the village in the future.

The steps recommended to you, and required by this permit, are for the advantage of the village, both from a sanitary and an economical standpoint.

I trust, therefore, that your board will take steps without delay to have the proper plans made.

A copy of this permit will be forwarded to the Board of Health for filing, as required by law.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

On October 10 a permit was issued subject to the following conditions:

I. This permit is granted for the period of one (1) year provided that within that period an application, accompanied by plans for an adequate system of sewers for the village of Celoron, shall be submitted by the said village board of trustees to this Department for approval, as required by article X of the village law.

II. This permit shall be revocable at any time by the State Commissioner of Health, or subject to modification or change if in the judgment of the said Commissioner, it shall become necessary or desirable.

III. The granting of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for the extension of the sewer system of said village or for permission to allow the discharge of additional sewage into the waters of this State.

Note.— This permit to become operative must first be recorded in the county clerk's office of Chautauqua county, in which the outlet of the sewer, or in which the establishment is located.

Reference to Celoron matter will be found under heading — Falconer — in this report.

DOLGEVILLE

A modification of the sewer plan consisting of a change of grade on Elm street extension was approved July 17, 1906.

EASTVIEW

LOEB CONVALESCENT HOME

Plans for a sewage disposal plant at the Loeb Convalescent Home at Eastview were approved on May 21, 1906.

WESTCHESTER COUNTY ALMSHOUSE

On December 18, 1905, plans for a sewer system and sewage disposal plant were submitted for approval. The engineers' reports appended give the successive steps taken before final approval of the plans.

SCHENECTADY, N. Y., *January* 24, 1906.

DR. E. H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— Replying to your letter of January 13th, received January 19th, transmitting plans for a sewage disposal system for the Westchester County Almshouse situated at Eastview, Westchester county, N. Y., I beg to say that I have examined the plans and herewith submit the following report of my examination:

The plans submitted comprise the following:

A map showing the location of the buildings and of the proposed sewage disposal system, signed by the designing engineer, George R. Byrne, and dated November, 1905; on tracing cloth, but not in duplicate.

A copy of the above map, showing the location and elevations of the surface of the ground in the vicinity of the site chosen for the sewage disposal works; also elevations of floors of the several buildings; signed by the designing engineer, George R. Byrne, and dated November, 1905; on tracing cloth, but not in duplicate.

A sheet containing drawings of receiving basin, sludge pit, filter bed and typical manhole, signed by the designing engineer, George R. Byrne, and dated November, 1905; on tracing cloth, but not in duplicate.

A typewritten set of specifications, estimate and proposal, and instructions to bidders; not in duplicate.

As the result of my examination of the plans with respect to their suitability for approval by this Department, I find the following deficiencies:

Omissions

1. None of the drawings nor the set of specifications are in duplicate as required.

2. No report describing the system and giving the data and assumptions on which the design was made is submitted as required.

3. No profile of the sewer lines is submitted as required.

4. The map of the sewer line does not contain any statement of the lengths nor grades of the several sections, and but few of the necessary invert elevations.

5. The drawings do not show, except by scaling, the dimensions of the filter beds; neither do they show the manner of arranging the "sand and gravel" filling indicated on one of the drawings.

Defects

1. The map shows the junction of service laterals with the main sewer to be made at points not at manholes, but in several cases near manholes. As far as possible each junction should occur at a manhole.

2. The plans show that six-inch sewer pipe is to be used not only for the main sewer, but also for the individual service sewers from the different buildings. This is undesirable; there should be one difference of size at least between the service sewer and the main sewer.

3. The only two elevations of the main sewer that are given show the sewer to have a grade between these points of less than 0.4 per cent., which for the given diameter and probable amount of sewage, is much too flat a grade. As the plans apparently contemplate the pumping of the sewage from the receiving basin to the sludge pit, there would seem to be no difficulty in the way of remedying this defect by lowering the receiving basin.

4. The absence of information regarding the population, sewage to be provided for, elevations, grades, etc., and the absence of any statement as to the manner of operating the system, render

it impossible to make any close examination of the system proposed, or to pass on its probable suitability.

I beg to recommend that the plans be returned to the proper authorities for their attention.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer

SCHENECTADY, N. Y., *March* 3, 1906.

DR. E. H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— On February 13th you referred to me for examination the corrected plans and specifications of the proposed system of sewers and sewage disposal for the Westchester County Almshouse, situated at Eastview, Westchester county.

These plans were previously before the Department and were reported on by me on January 24th.

The plans now submitted comprise the following:

A map showing the location of the buildings and of the proposed sewage disposal system, signed by the designing engineer, Mr. George R. Byrne, and dated November, 1905; on tracing cloth; in duplicate.

A copy of the above map, showing the location and elevations of the surface of the ground in the vicinity of the site chosen for the sewage disposal works; also elevations of floors of the several buildings, signed by the designing engineer, Mr. George R. Byrne, and dated November, 1905, on tracing cloth; in duplicate.

A profile of the eight-inch sewer line for connection with the hospital for consumptives to receiving basin; in duplicate.

A sheet containing drawings of receiving basin, sludge pit, filter bed and typical manhole, signed by the designing engineer, Mr. George R. Byrne, and dated November, 1905; on tracing cloth; in duplicate.

A typewritten set of specifications, estimate and proposal, and instructions to bidders; in duplicate.

A typewritten report by the designing engineer, Mr. George R. Byrne, describing the proposed system, not in duplicate.

Most of the omissions in the former set of plans having now been supplied, including the descriptive report by the designing engineer, the intended manner of operating the sewage disposal system is now indicated, and I beg to submit the following report of my examination of the system as proposed to be operated:

Defects

The defects Nos. 1, 2 and 4 of the former report have been rectified, and defect No. 3 relating to the flat grade of the sewer leading to the receiving basin, has been improved, and a flush tank placed at its upper end. A 0.5 per cent. grade is now proposed for this eight-inch sewer. This grade would be adequate if the quantity of sewage to be carried by the pipe were sufficient to ensure a half-full depth of flow, which will not be the case. A steeper grade is therefore greatly to be desired if it can be secured by still further lowering the receiving basin.

5. The engineer's report states that the population of the institution in the summer is about 200, and the present population about 330; that the amount of water used does not exceed 10,000 gallons a day; that the working capacity of the receiving basin is 29,600 gallons and that of the sludge pit is 31,000 gallons. It is intended to allow the sewage to accumulate in the receiving basin until this is about full, when it is to be pumped to the sludge pit, from which it is discharged into the automatic siphon chamber, which is to be regulated so that the sludge pit will just be emptied when it becomes necessary to pump again from the receiving basin.

From these data and statements it will be seen that the average age of the sewage when it is pumped from the receiving basin will be about thirty-six hours and will consist of a mixture of fresh sewage and sewage seventy-two hours old. This sewage will be still further detained in the sludge pit for a period averaging for the whole amount of sewage another thirty-six hours, although the last portions to be discharged from the tank will have been detained therein seventy-two hours. The filter beds will, therefore, receive doses of sewage varying widely in age and in its corresponding stages of decomposition. These are extremely

unfavorable conditions for the operation of filters, and a plan involving such conditions is not one to be approved.

6. Not only does the proposed plan of operation produce mixtures of sewage of widely different degrees of decomposition, but also it does not permit the regular, continuous and progressive subsidence and liquefaction of the solid matters, since each of the two basins is entirely emptied at each operation.

7. Under the above two sets of unfavorable conditions for preparing the sewage for efficient soil filtration, the rate of filtration resulting from the proposed dimensions of the beds will certainly be questionable, and in my opinion will quite likely be too high, even for the proper arrangement of filtering material.

8. The plan of arranging the filtering material in the beds shows one foot in depth of one and one-half-inch gravel; three feet in depth of gravel varying from one-half to one inch in size; covered by a top course of six inches of coarse sand. While this plan aims to secure a desirable increase in coarseness in the lower portions of the beds, the sudden change in size from coarse sand to one-half-inch or one-inch gravel would be almost certain to lead to settling of the sand into the voids of the upper course of gravel, with a consequent decrease in porosity, and consequent increased risk of clogging. This tendency would be greatly increased by the necessary raking and treading on the surface of the sand.

On account of the above-named objections it does not appear to me probable that the plant, if built as proposed, would operate efficiently and satisfactorily, and on this account I regret not to be able to recommend its approval. I beg to suggest, therefore, that the plans be returned to the authorities for further consideration.

The plans are herewith returned to you.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer

AMSTERDAM, N. Y., *May* 14, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In the matter of plans for sewerage and sewage disposal for the Westchester County Alms House at Eastview, Westchester Co., which were referred to me on May 9 for examination, I beg to report the following defects in the plans as submitted:

1. The location of the septic tank and receiving basin should be at some point more remote from the buildings than that shown.

2. In regard to the operation of the septic tank, attention is called to the fact that if the water consumption is 10,000 gallons per day as stated (which approximates the amount of sewage to be treated) and the capacity of the two septic chambers is 13,400 gallons, then the time of detention would be considerably longer than eight hours as is stated in the engineer's report. However, by opening the sluice gate at the outlet end of the second chamber of the septic tank, this second tank may be used as an adjunct to the receiving basin and the effective septic tank capacity will then be reduced to 6,700 gallons which will more nearly approximate the capacity needed to produce the proper time of detention, until the quantity of sewage increases to the point when both chambers should be thrown into use.

3. No provision is made in the septic tank plan; (a) To discharge sewage into tank No. 1 at mid depth and across the whole width of the tank by means of an apron similar to that shown.

(b) To collect effluent at the outlet from this tank from across the entire cross-section of the tank so as to produce uniform flow through the tank.

(c) To spread the effluent from tank No. 1 across the entire width of tank at its entrance to tank No. 2, by means of an apron or baffle plate.

(d) To draw effluent from tank No. 2 by means of a baffle board or other device and a wider outlet than that shown, from mid depth and from across the entire cross-section of the tank.

4. The operation of the pump to be used to deliver effluent to the filter beds should be controlled, preferably, by an automatic

device which is affected by the height of effluent in the receiving basin. This point is not covered by the plans or specifications.

I should recommend that the plans be approved after the correction of the defects noted above under paragraphs 2, 3, and 4, and after the location is changed as noted above under paragraph 1, or after a satisfactory reason is given for the location as shown.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

AMSTERDAM, N. Y., *June* 13, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In the matter of plans for the Westchester County Alms House at Eastview, Westchester Co., I have to report as follows:

In my report of May 14, 1906, following an examination of the plans then submitted for approval, there were noted four defects. The plans were returned to the county engineer, Mr. Byrne, and on June 9, 1906, I met Mr. Byrne by your appointment at the office of the Department. The plans are now presented for approval, and the four defects above noted are corrected, and I therefore recommend the approval of the plans.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

On June 20 the plans were approved and on June 27 a permit issued to the board of supervisors of Westchester county, to discharge the effluent from the sewage disposal plant into the water of Sawmill creek at Eastview under the following conditions:

PERMIT

Application having been duly made as provided by section 76 of the Public Health Law as amended by chapter 468 of the Laws of 1903, permission is hereby given to the board of supervisors of Westchester county to discharge the effluent from the

sewage disposal plant into the waters of the Sawmill creek at Eastview within Westchester county in accordance with the plans accompanying the petition, under the following conditions:

1. That the only sewage shall be that of the effluent from the disposal works for which plans are included in the above system.

2. That both the sewers and the disposal system used for such discharge of effluent shall be built in full conformity with the plans herein referred to, or such as may be subsequently approved by the State Department of Health.

3. That the length of time after the receipt of notice of revocation of this permit, within which the discharge of sewage from this system shall be discontinued, shall be one year, in accordance with section 78 of the Public Health Law.

4. That this permit shall be revocable at any time when, in the judgment of the State Commissioner of Health, an appreciable pollution of the stream shall be caused or the operation of the disposal plant shall be unsatisfactory.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, *June* 27, 1906.

NOTE.— This permit to become operative must first be recorded in the county clerk's office of Westchester county, in which the outlet of the sewer, or in which the establishment is located.

GARDEN CITY

On November 9, 1905, a plan showing extensions to the Garden City sewer system was submitted for approval. The plan included sewers in the Cedar Valley drainage district and was approved April 23, 1906.

HAWTHORN

Plans for a sewage disposal plant for the Jewish Aid and Protectory Society institution at Hawthorn were approved May 21, 1906.

INDIAN LAKE

On September 8, 1905, at a meeting of the town board of Indian Lake, Hamilton county, a sewer district was established

and a sewer commission appointed pursuant to the provisions of chapter 348, Laws of 1901. The plans were filed with the Department September 12, 1905, were later returned for correction, and on July 16, 1906, were approved. A permit was issued to the sewer commission of Indian Lake to discharge sewage into Indian river and Pinney pond outlet, on conditions relating to the revocation of the permit and to the construction of a sewage disposal plant when required by the Commissioner.

ITHACA

On January 18, preliminary plans were submitted by the Sewer Commission for remedying the manner of disposing of the sewage of the city. Certain portions of the plans and recommendations as submitted were approved by the Commissioner, and when final plans were submitted in accordance with the approved preliminary plans, they were, on July 25th, approved by the Commissioner.

LAKE PLACID

Plans for extensions to the sewer system on four streets of the village were filed with the Department on June 25th. On August 11th the plans were approved.

LESTERSHIRE

During the latter part of the year 1905, a question arose as to the direct discharge of untreated sewage into the Susquehanna river at Lestershire, Broome county.

The following correspondence in the matter is explanatory:

ALBANY, N. Y., *December* 15, 1905.

MR. J. E. HILL, *Village Clerk, Lestershire, N. Y.:*

DEAR SIR:— On October 6th you made application to this Department for a permit to discharge, through a proposed new outlet sewer of your sewer system, untreated sewage which then already was being discharged into the river through an existing private sewer, stating that:

" It was understood that the outlet was intended to communicate directly with the river at or near Willow Point, the sewer in

question being a trunk line only and built with a view of draining accumulated surface water, and not with any idea that any house connections would be made within a period of two years at least."

There being in this office no knowledge or evidence of any such intention or permission to connect any trunk sewer with the river directly and without the sewage first passing through the disposal plant, a letter was sent you on October 10th by Secretary Seymour of this Department asking that plans for such proposed changes from the plan as originally amended should be sent to this Department.

On October 20th you replied that the tracings of such plans had been transmitted to the then State Commissioner of Health, Dr. Lewis, about November 10, 1904, and that they had been returned with his signature of approval and filed in your office on February 20, 1905. You also stated that you were then forwarding to this office under separate cover blueprints of these tracings, and, if necessary, would forward the original tracings still on file in your office.

In reply to your communication, I beg to state that up to this time we have not received the blueprints you stated would be sent. Neither the register of sewer plans received and approved nor our files of copies of plans approved contain any evidence of any plans of your system received by this Department subsequent to October 4, 1904, at which time the amended plans were approved by former Commissioner Lewis, the original sewer plans having been approved on February 27, 1903.

While it is, of course, possible that former Commissioner Lewis may have approved a second amendment providing for the direct discharge of a trunk sewer into the river, without having such plan either registered or filed, it is extremely improbable that he should have done so, and in the absence of any knowledge or evidence in this office of such approval I am obliged to assume that such approval was never given. If, however, you have any evidence that such approval was given, or evidence of any amended plans having been approved by this Department after October 4, 1904, I shall be glad to have you send me such evidence, and on receipt thereof I will give it proper consideration.

Unless you have evidence which shall modify the situation, the matter stands as follows:

On February 27, 1903, this Department approved plans for a system of sewers and sewage disposal for your village, the request to be allowed to discharge the sewage from your proposed sewer system directly into the Susquehanna river without treatment having been declined. On October 4, 1904, the Department approved of certain proposed changes or amendments to the original plans so far as they affected certain sewers in the vicinity of Willow street and the Delaware, Lackawanna and Western railroad, but not affecting the disposal works nor the outlet to the river.

This Department has, therefore, never given, so far as the records show, any permission whatever to discharge any sewers in your village directly into the river without treatment, and accordingly your application of October 6th, which was based on the supposition that such permission had been given, cannot be considered.

Regretting my inability to comply with the request of your board, I am, dear sir,

Very truly yours,

EUGENE H. PORTER,

State Commissioner of Health

LESTERSHIRE, N. Y., *January* 3, 1906.

To the State Department of Health, Albany, N. Y.:

Whereas, There exists in several parts of the village of Lestershire the following unsanitary conditions which the local board of health is unable to abate, namely, inadequate means of disposing of the sewage in the business section of the village, and in other places cesspools which are overflowing, the ground being full of springs and also saturated with sewage, and

Whereas, Unless the State Department of Health grant a temporary permit to empty the sewer into the Susquehanna river until such time as the village board of trustees can construct the necessary aseptic tank, the existing conditions constitute a menace to the health of the people of the village which can be abated only by using the sewer as it is now constructed;

Resolved, That the board of health of the village of Lestershire,

at a special meeting held on the 3d day of January, 1906, petition the State Department of Health to grant such temporary permit for the relief of the existing conditions.

C. F. ROBERTS, *Inspector*
JOHN C. CALDWELL
CHAS. S. WILSON, M.D.
W. H. WILSON, M.D., *Health Officer*

ALBANY, N. Y., *February* 7, 1906.

Permit for the village of Lestershire to discharge sewage into the waters of the Susquehanna river.

The plans for a sewer system for the village of Lestershire having been approved by the State Department of Health on February 27, 1903, and amended plans for the said system having been approved on October 4, 1904, and the said plans having provided for a sewer system and sewage disposal plant, and the trustees of the said village having made application to this Department, as provided by section 76 of the Public Health Law, as amended by chapter 468 of the Laws of 1903, for a permit to discharge sewage from the said sewer system directly into the waters of the Susquehanna river without treatment, and it appearing that the authorities of the said village have constructed the said sewer system, but have failed and neglected to construct the sewage disposal plant as provided for in the plans heretofore approved by this Department, and a hearing having been had at the office of the State Commissioner of Health, in Albany, on the 30th day of January, 1906, at which were present Dr. Eugene H. Porter, the State Commissioner of Health, Homer J. Anderson, one of the trustees of the village of Lestershire, and Thomas J. Mangan, Esq., attorney for the village of Lestershire, at which the matter was discussed and affidavits submitted for the said village, and, further, that in order for the village to construct the sewage disposal plant, it will be necessary for the proposition to be submitted by the said village authorities on the issuance of bonds for such purpose, and that in order to acquire title to the land upon which to erect the said sewage disposal plant, it will be necessary to bring condemnation proceedings, which would take a considerable length of time.

Now, therefore, in consideration of the above facts, and in consideration of the full and faithful compliance on the part of the trustees of the village of Lestershire with the terms and conditions under which this permit is granted, permission is hereby given to the trustees of the village of Lestershire, Broome county, N. Y., or the public authorities having by law charge of the sewer system of such municipality, to directly sewer from that portion of the sewer system of the village of Lestershire, which has already been constructed as above stated, into the waters of the Susquehanna river within the municipality of the town of Union, on the following terms and conditions:

First. This permit is given in consideration of the agreement on the part of the trustees of the village of Lestershire that they will, within a period of two years from date hereof, provide, construct and equip, in a thorough and complete condition ready for use, a sewage disposal system in accordance with the plans for such system which were approved by the State Commissioner of Health on February 27, 1903, and will connect the same with the sewer system of the village.

Second. This permit shall be limited to a period of two years from date hereof and shall be revocable at any time by the State Commissioner of Health, or subject to modification or change if in the judgment of the State Commissioner of Health the terms and conditions on which this permit is granted are not being faithfully complied with.

Third. The granting of this permit shall not be deemed to affect in any way action by this Department on any future applications that may be made for the extension of said sewer system, or for permission to allow the discharge of additional sewage into the said waters.

Fourth. This permit shall be and become operative and in force when duly accepted by formal resolution of the board of trustees of the village of Lestershire duly adopted, and when duly recorded in the county clerk's office of Broome county.

EUGENE H. PORTER,
State Commissioner of Health

Witness: A. H. SEYMOUR, *Secretary*

On February 19th the village board of trustees accepted the permit by formal resolution according to its fourth clause and ordered it filed in the county clerk's office of Broome county, thereby making it operative.

LOCKPORT

On June 20th application was received from the city of Lockport to extend the Park avenue sewer in that city, and on September 17th the plans were approved and a permit granted.

MARCELLUS

Plans for a sewer system for the village were submitted on February 19th, and after having been returned for correction were approved on July 25th.

A permit was issued with modifying conditions allowing the discharge of sewage into the waters of Nine Mile creek.

MATTEAWAN

On December 27, 1905, plans were submitted for a sewage disposal plant to be substituted for plans approved June 19, 1903.

On February 26th these substitute plans were approved. Subsequently an amended set of plans, showing changes relating principally to the size of the plant as it was proposed to be at first constructed, were submitted and approved July 25th.

MILFORD

On January 15th plans for a sewer system were submitted to the Department for approval.

On March 8th the plans were returned for correction and the village authorities notified that before approval of plans it would be necessary for the village to file a plan for a sewage disposal plant. The plans, which finally included a design of the disposal plant, were approved on July 31st.

On September 28th a permit was granted by the State Commissioner of Health allowing the direct discharge of sewage into the Susquehanna river from the sewer system of the village of Milford for a period of three years, provided that within that

time a sewage disposal plant should be erected by the village in accordance with the approved plans.

The permit was to become operative on its acceptance by resolution of the trustees and when filed in the county clerk's office of Otsego county. At the close of the year notice of such resolution and filing had not been received.

MOHAWK

On August 17th a plan was received calling for a slight change in the route of the main outlet sewer.

On August 25th the amended plan was approved.

MT. KISCO

Plans for sewerage and sewage disposal for the village of Mt. Kisco, have been before the Department for approval for more than two years.

Approval of these plans was delayed owing to the fact that the village of Mt. Kisco and the city of New York, failed to reach an agreement as to which municipality should bear the assessment of cost. The plans were approved December 31, 1906.

NEWARK

On August 8th, plans for sewerage and sewage disposal were formally submitted to the Department for approval by the consulting engineer on behalf of the village. On August 9th, the plans were approved subject to a schedule of modifications and corrections which the engineer presenting plans agreed to embody in the plans. On August 9th a permit was issued allowing, under certain conditions, discharge of the effluent from the proposed sewage disposal plant into the waters of Military brook in the village of Newark.

NORWICH

Plans for amendments to the original sewer plan as approved in 1892 and for extensions to the system were submitted during the early part of the year and approved on April 3d and April 11th.

OWASCO COUNTRY CLUB, CAYUGA COUNTY

At the solicitation of the water commissioners of the city of Auburn, an inspection was made by the Department to ascertain

alleged violations of the water protection rules, and as one of the results of such inspection, plans were submitted by the Owasco Country Club for a sewage disposal plant and approved by the Department on November 10th.

PIERMONT-ON-HUDSON

Plans for a sewage disposal plant for Fort Comfort Inn at Piermont-on-Hudson were submitted to the Department and approved September 21st.

POCANTICO HILLS

ST. JOSEPH'S NORMAL COLLEGE

NEW YORK, *October* 12, 1905.

Dr. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — We submit herewith for examination plans for disposing of the sewage from St. Joseph's Normal College buildings, at Pocantico Hills, N. Y., and would be pleased to receive your approval.

The buildings to be provided for are the main building, and a separate building to be used as a laundry. Both of these are in course of construction, and they are the only ones which will contain plumbing fixtures. The construction of additional buildings is not contemplated.

Roof water, the overflow from cisterns, and all surface water will be excluded from the disposal system, which will be required to dispose of plumbing wastes only.

A sewer for carrying these wastes will begin at the main building, follow a road to the laundry, which will be connected, and from that point will follow the most direct line to the disposal area.

The water supply will be obtained from one or more artesian wells. A well has been driven to a depth of about 700 feet, where a flow of only seven gallons per minute is obtained, and the driving of another well is being considered.

The minimum numbers of persons to be provided for is from sixty to eighty, and this will be during vacation times. The aver-

age number during the school terms will be 200. The number on special occasions, visitors to exercises, etc., may make a maximum of 300 for short periods.

The above numbers are totals of all inmates including students, instructors and all employees.

As the supply of water will be limited, and will have to be pumped with a lift of probably over 200 feet to the main building on very high ground, great care will be used to avoid wasting it. We believe that the consumption will be less than fifty gallons per capita per day, but in designing the sewage disposal system we have assumed fifty gallons each for 200 persons, or 10,000 gallons, as representing the daily discharge of sewage for ten months in the year, and have also provided in the tank capacities to avoid carrying the septic action too far during the periods when there may be a minimum of sixty to eighty persons, with a daily quantity of sewage of from 3,000 to 4,000 gallons.

We propose to purify the sewage by broad irrigation, after passing it through tanks which will withhold the larger matters in suspension and discharge the overflow periodically.

The sewage will first enter a valve chamber, where by means of slide valves it may be diverted to either one or two adjoining compartments for sedimentation. The combined capacities of the two compartments will be 1,837 gallons, but during periods when the quantity of sewage is small, and the septic action may be carried too far, one compartment may be thrown out of use. The same may be done when necessary to clean the compartments, each being provided with a blow-off or drain pipe, leading from its bottom to a trench below, and controlled by a valve in the chamber adjoining the tank. The blow-off trench when filled to a depth of one foot will hold the entire contents of one compartment, and after the liquid has percolated into the ground the remaining solids may be composted and removed.

The sediment compartments are provided with trapped outlets to the adjoining flush-tank, which will hold 4,000 gallons. This will be provided with a six-inch automatic siphon, and will also have a six-inch gate valve, which may be opened to empty the tank at any time. The siphon will empty the flush-tank in fifteen minutes or a little less.

We have shown and propose to use a single siphon instead of automatic rotating siphons, for several reasons: (1) Rotating siphons cannot be depended upon to operate automatically in rotation, and should have frequent attention to make it certain that they are doing so. (2) Installed as automatic devices they are relied upon to too great an extent. (3) The disposal system should have attention as part of the daily routine of the attendant. The authorities are voluntarily proposing to install a sewage disposal system, and it is their intention to give it the attention required for its proper operation. (4) The cost of rotating siphons will be twice as much as the cost of a single siphon and the necessary gate chamber and gates for diverting the flow from one to another of the irrigation tracts.

The discharge pipe from the siphon chamber to the gate chamber, and the feeders from the latter to the distributing troughs will be eight-inch vitrified pipes with cemented joints, laid on a grade of one in 250, which will discharge the 4,000 gallons delivered by the flush-tank in fifteen minutes. Should there be any question about this we will increase the rate of fall to any further slight extent you may recommend.

The distributing troughs will be of 1½-inch plank, put together with screws after first being thoroughly tar coated. They will have 2 inches by 1 inch openings every two feet along their lower sides, from which the liquid will spill on aprons and thence on the ground along the upper side of the irrigation tracts.

The total area to be prepared for irrigation will be 470 feet long and 135 feet wide, having a surface area of 63,450 square feet, or 1½ acres, divided into three tracts of one-half acre each, with slight embankments between them. The surface will be graded to a practically uniform slope from top to bottom, with a fall of one foot in 12 to 13 feet, slightly less along the upper edge of the area, which receives the sewage first, to assist in spreading it more uniformly. The entire area after grading will be ploughed, harrowed, seeded and rolled, and a strong growth of grass secured before the system is placed in operation.

Underdrains will be laid in lines 25 feet apart, of 3-inch agricultural drain tiles, at a depth not less than four feet anywhere, connecting into a 4-inch underdrain at the foot of the tract, which

will continue to an outlet into the brook 160 feet from the nearest edge of the disposal area.

Above the irrigation area a shallow ditch will be provided for intercepting and diverting all surface water which may come down from the slopes above. There will therefore be no surface water to be taken care of on the irrigation area except the rain which falls directly upon it.

We trust the above will meet with your approval.

Respectfully submitted,

WARING, CHAPMAN & FARQUHAR

SCHENECTADY, N. Y., *February* 19, 1906.

Dr. E. H. PORTER, *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR:— I beg to report as follows on my examination of the plans for the sewage disposal system for St. Joseph's Normal College at Pocantico Hills, Westchester county, N. Y., which you referred to me for examination on December 14, 1905.

My examination of the plans showed a number of points requiring modification, and accordingly they have been twice sent to the designing engineers for changes in accordance therewith. These changes have now, with one exception, been made, and it is requested by the designing engineers that the plans be approved subject to the condition that this change shall be made when found necessary.

I beg to recommend, therefore, that the plans in their present form be approved, subject to the following conditions to be attached to the approval clause:

"Subject to the condition that modifications in the method of securing a distribution of the sewage over the irrigation area in winter shall be made in the works when in the opinion of the State Commissioner of Health this shall be found necessary."

The plans, with the corrections in duplicate, are herewith returned to you.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer

The plans were approved February 26th, subject to the condition suggested in the consulting engineer's report.

NEW YORK STATE HOSPITAL FOR INCIPIENT TUBERCULOSIS AT RAYBROOK

Plan for a dosing chamber and filter beds to complete the sewage purification plant of this institution were approved on June 25, 1906, and the works were constructed during the summer of 1906. Prior to the construction of these two structures a septic tank had been constructed and had been in operation for a period of two years.

Upon the completion of the work of construction of the dosing tank and filter, and upon the request of State Architect Heins and Superintendent M. P. Burnham, an official inspection was made by this division and recommendations made for acceptance of the work upon condition set forth in the engineer's report submitted herewith.

ALBANY, N. Y., *September* 27, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to report that the sewage disposal plant for the Hospital for Incipient Tuberculosis at Raybrook, which has been recently completed and put into operation and an inspection for approval of which was requested by State Architect Heins in his letter to you, dated September 12th, has been inspected by one of the assistant engineers of this Department.

The plant, as now constructed and operated, appears to be satisfactory in almost every respect. The construction agrees with the plans filed in this office and on the day of the visit the tanks and filter beds were operating satisfactorily, the effluent being clear, odorless and colorless, and it is safe to assume that the bacterial purification is also satisfactory.

One feature which will require alteration or repair is, that at present there is some leakage from the old discharge pipe from the septic tank into the ravine. This leakage is only partially purified. When this old drain is repaired, as is expected by the superintendent when the septic tank is again cleaned, and this

leakage prevented, the operation of the plant should be satisfactory in every respect. With this exception I consider the construction work of this plant in a satisfactory and acceptable condition.

Respectfuly submitted,

THEODORE HORTON,

Consulting Engineer

St. Johnsville

Plans for a sewer system and sewage disposal plant were received during the latter part of 1905. Owing to delay in the submission of specifications, etc., the plans were not approved until May 9, 1906.

Saratoga Springs

On September 4th plans were submitted by Mr. F. C. Bishop of Saratoga Springs for a private sewage disposal plant and sewer to discharge, ultimately, into the Kayaderosseras creek. On September 27th the plans were approved and a permit for the discharge of effluent from the plant was granted, subject to certain conditions.

Schenectady

As noted in the twenty-sixth annual report, on August 15, 1905, the city authorities made application to the State Commissioner of Health for the approval of plans for certain additional sewers. The report of the consulting engineer of the Department in the matter is printed in above Department report.

Albany, N. Y., *April* 3, 1906.

Mr. Lewis B. Sebring, *City Engineer, Schenectady, N. Y.:*

Dear Sir:— Replying to your request of March 16th, asking me to advise you the exact scope of the requirements regarding the city of Schenectady and upon what conditions a permit will be granted to sewer directly into the Mohawk river without treatment, from the sewer system now contemplated by the authorities of your city, I would say that this matter was carefully discussed

at the meeting at which you were present between Mayor Clute, Professor Landreth and myself.

The terms were practically agreed upon at that time, and the plans for your additional sewers, indicated at that meeting will be approved, when satisfactory to the consulting engineer of the Department, and a permit issued to discharge into the Mohawk river, under the following conditions:

First. A permit will be granted for a period of five years, provided the city of Schenectady shall within three years acquire title to land upon which to erect a sewage disposal plant, and actually begin to construct a sewage disposal plant to treat the sewage of the entire city, and that said plant shall be in operation within the five-year period.

Second. The permit is to be accepted by the proper authorities of the said city by resolution duly passed, on the terms and conditions under which it is granted.

Third. The permit is to be revocable at any time by the State Commissioner of Health, or subject to modification or change if the terms and conditions upon which it is granted are not being complied with, or the interests of public health, in the judgment of the Commissioner, demand it.

Fourth. The granting of the permit shall not be deemed in any way to affect future applications by the city to extend its sewer system or discharge additional sewage into said waters.

Fifth. The permit to become operative only when accepted by formal resolution of the common council of the city of Schenectady and duly recorded.

I have outlined the conditions of the permit as mutually understood at the conference.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

On April 24th plans were submitted for additions to the sewerage system of the city of Schenectady. The report of the

city engineer regarding the plans as submitted for approval follows:

SCHENECTADY, N. Y., *April* 23, 1906.

DANIEL G. VEDDER, Esq., *Commissioner of Public Works, Schenectady, N. Y.:*

DEAR SIR:— I have the honor to submit to you herewith plans for additions to the sewerage system of the city of Schenectady, comprising lateral sewers for all the Ninth and Tenth wards, and a portion of the Eighth ward; main sewers from Henry street to South Center street through Cotton Factory Hollow; from Crane street to South Center street along the New York Central railroad; through South Center street, Weaver street, Edison avenue, Lyon street and Washington avenue, to a point near Water street; thence over private right-of-way and following the river bank to Mohawk avenue; thence crossing the river to a location for a disposal plant on the north side of the Mohawk river, in the town of Glenville.

The following is a general plan for the additions to the sewerage system of this city preparatory to installing a sewage disposal plant to treat the entire sewerage. We intend to separate all the sanitary sewage from the surface water, and treat only the sanitary sewage, and all the new work proposed at the present time is with that end in view. We intend to take out all the sewers that flow into the creeks and run them into mains which are to be built, so that they will connect with the disposal plant. We will not be able at the present time to take all the sanitary sewers out of the creeks, but our plan is to gradually do this and complete the matter as soon as possible.

The plan accompanying this report shows lateral sewers in all the streets of the Ninth and Tenth wards which are laid out upon any maps available, and the size of the mains are calculated to cover all the territory available and all which may be available even if the boundary of the city is extended for a considerable distance. The calculations of quantities and sizes are based upon thirty people to each hundred feet — each using 100 gallons per day. The velocity has been kept above two feet a second without exception.

We find that the grades of the upper part of the Tenth ward are such that if we run by gravity into the system, we will be compelled to make some cuts of twenty-five to twenty-eight feet for a considerable distance, and we believe that by putting in a sewage lift on Olean street, which will be operated by an electric motor running an air compresser and lifting by compressed air, we will save a considerable amount in doing away with deep cutting and also being able to sewer a portion of the city, which we would not be able to do, if we run by gravity alone. We propose either using an Ellis, Ansonia or Shone lift, whichever may be best suited to our purpose upon further investigation. The force main will be laid to the nearest motor-house on Broadway on the gravity system.

We propose using iron pipe as shown upon the plans in the New York Central and Cotton Factory Hollow mains on account of the condition of the soil which is very soft, and on account of not having to make any connections for the full length. We propose to use vitrified sewer pipe for the remainder, including our thirty-six-inch main, but this matter is not fully settled in regard to the thirty-six-inch main, and the choice will lie between vitrified pipe and concrete, in either case being supported by sufficient under-pinning to insure stability and support. We propose to lay auxilliary sewers in the streets with our large mains to avoid the necessity of putting in "Y's" upon said mains, and we also propose to lay auxilliary sewers where the depth is excessive.

We propose to connect the General Electric Company's sewerage system with our mains when theirs has been relaid and the sanitary separated from the surface-water sewers. The said system will enter our mains at the junction of Edison and Washington avenues. The main sewer of the portion constructed and in use at the present time will be tapped on Front street near Nott street, and lead back on Front street to Mohawk avenue to the river and joined with the outfall sewer which is shown upon the plan.

A centrifugal or triplex pumping plant will be installed at this point of sufficient size to handle the full amount of sewage, which will be pumped across the river to an elevation sufficient

to enter the septic tanks, and thence flow by gravity to the remainder of the disposal plant.

The disposal plant which is proposed will, in general, be septic tanks and sprinkling filters similar in many respects to that designed and about to be constructed for the city of Columbus, Ohio. Before definitely deciding upon the disposal system and the details of the same, we desire to investigate the matter more fully so that the city may be assured when the plan is finally adopted that it would be the best system available with the present light upon the subject.

The plant will be constructed of sufficient size to treat the entire sewage of the city at the time of installation, and will be so arranged that it may be enlarged whenever necessary.

We believe that we will be able to sewer the easterly end of the Second ward by gravity into the system, but if this is not possible, a sewage lift will have to be installed upon the low-lying level between Van Vranken avenue and Maxon road.

The amount of construction which we desire to do this year covers the main sewer from where it crosses Mill creek on Washington avenue to South Center street, and on South Center street easterly to its junction with the Cotton Factory Hollow main, and westerly to its junction with Broadway main; the Cotton Factory Hollow main to Henry street; The New York Central's main to Crane street; the Broadway main complete, and as many lateral sewers in the Eighth, Ninth and Tenth wards as possible, constructing the ones at present which are most needed, and leaving the streets with the most vacant land for future installation.

I enclose herewith a list of streets and mains desired to be laid this year. Kindly transmit a copy of the above to his Honor, Mayor Clute, that he may send it to the State Department of Health. I have the honor to be,

Yours very truly,

LEWIS B. SEBRING,

City Engineer

City of Schenectady

	Number of feet.
Hegeman street	1,655
Guilderland avenue	4,153
Genesee street	200
Helderberg avenue	2,410
Cedar street	900
Jerome avenue	900
Ford street	850
Wabash avenue	928
Euclid avenue	1,246
Osterlitz avenue	800
Ontario street	1,500
Author street	970
Cora street	390
Shannon street	700
Eleanor street	1,285
Ninth street	470
Broadway	6,198
Campbell avenue	3,695
Broad street	895
Hugh street	820
Bradt street	850
Thomson street	1,402
Cherry street	648
Fairview avenue	1,628
Turner avenue	1,305
Eleventh street	1,260
Third street	505
Fifth street	480
Second street	400
Perry street	1,320
Harrison avenue	2,410
Cleveland avenue	1,380
Westinghouse place	150
William street	1,180
Center street	1,900
Lower Broadway	700
Grand street	275
Delaware place	575
Weaver street	1,485
Edison avenue	860
Washington avenue	1,050
Neil street	2,005
Cotton Factory hollow	9,100
Maplewood avenue	285
Howard street	990
Lansing street	530
Crane street	6,165
Francis street	1,205
Chrisler avenue	2,160
Bridge street	2,475
First avenue	680
Second avenue	905
Third avenue	1,400
Fourth avenue	1,345
Fifth avenue	845
Sixth avenue	1,540
Seventh avenue	1,510
Eighth avenue	1,220
Congress street	3,390
Cutler avenue	4,975
Davis terrace	1,265
Pleasant street	2,800
Webster street	2,145
Sunset street	510
Bailey street	600
Glendale place	1,310
Milton avenue	390
Willett street	2,430
Orchard street	400
Yorkston street	315
Chrisler & Lakeview avenues	1,785
Avenue A	500
Avenue B	1,500
Raymond street	3,000
Outlet line along New York Central	6,200

AMSTERDAM, N. Y., *May* 21, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In accordance with your instructions, and in the manner which you have outlined, I have made an examination of the general sanitary features of the plans for extensions to the Schenectady sewer system, which were on April 23d submitted to the State Department of Health for approval.

At your suggestion, I visited Schenectady and, in company with City Engineer L. B. Sebring, inspected certain localities where sewers are proposed.

The plans call for pumping of the entire sewage of the city across the river at the foot of Mohawk street to the disposal plant site, near the northerly end of Freeman's bridge. A question arises as to whether some of the highest-level sewage could not be brought together at some point sufficiently high to permit its conveyance to the disposal plant site by an inverted siphon under the river, and thus reduce the future annual expense of pumping.

Mr. Sebring assures me that this feature has been studied and found impracticable. Pursuant to your instructions, I have made no study of this question.

Similar investigations have been made with respect to pumping sewage at Olean street, and a gravity system for this district has been found impracticable.

The sewer invert line of the trunk or outlet sewer along the river front is not shown on the profile below the point where construction is to end this season, but inasmuch as this main trunk sewer along Washington avenue, etc., is planned to be built on minimum permissible grades, this does not constitute a serious omission.

The plans submitted do not include a design of the disposal plant, but inasmuch as an agreement exists between the State Department and the Schenectady authorities under the conditions of which the construction of a sewage disposal plant is deferred until a specified time, I do not think the plans for the disposal plant need be submitted at this time.

I am returning the plans, via American Express, and to the

extent that my examination has, at your suggestion, been carried, would recommend their approval.

Respectfully submitted,

H. B. CLEVELAND,

Inspecting Engineer

On May 22d the plans were approved and a permit as outlined above was issued. This permit was on June 6th duly accepted by resolution of the common council of the city.

On July 31st plans were approved for the construction of sewers on Elmer avenue, Stanford street, Plymouth avenue, Haigh avenue and Dean street.

Scotia

On February 14th plans were submitted for extensions to the sewer system of the village. On April 11th these plans for sewers in Glen avenue and other adjoining streets were approved and the following permit was issued:

PERMIT

Application having been duly made as provided by section 76 of the Public Health Law as amended by chapter 468 of the Laws of 1903, permission is hereby given to the sewer commissioners of the village of Scotia, N. Y., to discharge sewage from the sewer system of said village into the waters of the Mohawk river at Scotia, in accordance with the following conditions:

Written proof having been submitted to this Department as heretofore stipulated that the contracts for the disposal plant have been let, and that no sewage has been discharged from said system, and that while title to the lands upon which to erect the said sewage disposal plant has not been secured, the matter is now pending before a referee, and that the proceedings to secure the condemnation of said land will be prosecuted as rapidly as possible. This permit is limited to 250 houses, and is not to extend later than October 1, 1906, at the expiration of which stipulated period it will terminate and may be revoked without further notice than that contained herein.

EUGENE H. PORTER, M.D.,

State Commissioner of Health

Albany, *April* 11, 1906.

NOTE.— This permit to become operative must first be recorded in the county clerk's office of Schenectady county, in which the outlet of the sewer, or in which the establishment is located.

SILVER LAKE SANATORIUM, WYOMING COUNTY

On May 2d plans were approved contingent on certain changes, for a sewage disposal plant for the Silver Lake Sanatorium, located on Silver lake, Wyoming county, and on May 9th the following permit was issued:

PERMIT

Application having been duly made as provided by section 77 of the Public Health Law as amended by chapter 468 of the Laws of 1903, permission is hereby given to Dr. James S. Dawson to construct a sewage disposal plant for the Silver Lake Sanatorium, in the town of Castile, Wyoming county, the effluent to be discharged into the waters of Silver lake, in accordance with the plans accompanying the petition, under the following conditions:

That the two defects noted in the Inspecting Engineer's report be remedied before the installation of the plant; and it is further stipulated that this permit is revocable upon due notice, if at any time the plant discharges an unsatisfactory effluent, or that the discharge produces, in the opinion of the State Commissioner of Health, an appreciable pollution of the waters of the lake.

EUGENE H. PORTER, M.D.,

State Commissioner of Health

ALBANY, *May* 9, 1906.

NOTE.— This permit to become operative must first be recorded in the county clerk's office of Wyoming county, in which the outlet of the sewer, or in which the establishment is located.

AMSTERDAM, N. Y., *April* 28, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, N. Y.*:

DEAR SIR:— In the matter of plans for a sewage disposal plant for the Silver Lake Sanatorium which you submitted to me for examination on April 25th, preliminary to approval by the State Department of Health, I beg leave to report as follows:

Present plans are substituted for certain plans recently sent before the Department and which you returned to Dr. J. S. Dawson, proprietor of the Sanatorium, for the supplying of certain omissions and the correction of certain defects noted in my report of April 3d.

Referring to my report to the Department on examination of plans first submitted, dated April 3d:

Under omissions:

(2) A report describing basis of operation and design of the plant is still omitted, but inasmuch as the data pertinent to the case is on record in the office of the Department, this omission may be overlooked.

Under defects:

(3) The valve for the dosing chamber is of a type certain to cause trouble, sooner or later. The valve seat over the outlet pipe may become clogged, or the movable parts may become rusted and fail to operate, thus defeating a necessary step for the successful operation of the plant.

I would suggest that a four-inch automatic siphon, without movable parts, and depending on an air lock for intermittent discharge, be substituted for the valve arrangement shown.

In regard to the subsoil piping system, it is proposed to discharge 160 cubic feet of effluent into 150 lineal feet of 4-inch subsoil pipe having a capacity of about 13 cubic feet. Undoubtedly, some of the effluent will seep away through the open joints of the subsoil piping during the discharge from the dosing chamber, but the length of the subsoil piping is not sufficient to care for the dose to be delivered. If the two defects noted last above were remedied, I should recommend the approval of the plans as presented.

Respectfully submitted,

H. B. CLEVELAND,

Inspecting Engineer

SWINBURNE ISLAND, STATE QUARANTINE STATION

January 5th a plan for an outlet sewer from the Quarantine station was approved and a permit to discharge sewage granted by the State Commissioner of Health.

TROY

As noted in the last annual report, an understanding was reached during 1905, between the Department and the city of Troy, in relation to the approval of sewer plans which should in the future be submitted to the Department.

TROY, N. Y., *April* 11, 1906.

DR. E. H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— The board of estimate and apportionment has authorized the city engineer to appoint a competent engineer to design a separate system of sewers in accordance with your request to the board of contract and supply. I understood from my last talk with you that if such action was taken and the city proceeded to make such a design that for the construction of small sewers permits would be granted. We have now two such sewers to construct.

If you desire I will come to your office any afternoon of this week or next week, and bring with me the profile of these sewers.

Let me know what afternoon will be convenient for you.

Yours very truly,

E. R. CARY,
City Engineer

TROY, N. Y., *April* 18, 1906.

E. H. PORTER, M. D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— The board of contract and supply of the city of Troy desires permission to construct sewers in West Park place, between Thirteenth and Twelfth streets, and in Lake avenue, between Pinewoods avenue and Belle avenue, the drawings for which have been submitted to you.

Yours respectfully,

E. R. CARY,
City Engineer

AMSTERDAM, N. Y., *June* 23, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In re plans for extensions to the sewer system of the city of Troy on Lake avenue and West Park place, which you referred to me for investigation, I have to report that I have examined said plans and conferred with the city engineer at Troy in regard to the matter and would recommend that the plans be approved and permits for their construction be granted.

The city of Troy is now causing to be made a plan for a separate system of sewers which when constructed will serve, in conjunction with the present combined system, as a sanitary sewer system, while the present combined system will serve as a storm water and roof water sewer system.

The extensions proposed are directly in harmony with such a separate system of sewers and their construction will entail no sacrifice when the separate system is installed.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

The plan for the West Park place sewer was approved June 26, 1906.

TUCKAHOE

On December 20, 1905, plans and specifications for a sewer system and sewage disposal plant for the village of Tuckahoe were filed with the Department.

On March 20th the plans were returned for correction.

The plans were resubmitted on June 9th and approved by the State Commissioner of Health on June 20th.

On June 27th a permit was issued to the board of trustees of the village of Tuckahoe, allowing discharge of the effluent from a disposal plant into the Bronx river subject to the usual conditions.

VALHALLA

JENNIE CLARKSON HOME FOR CHILDREN

On June 29th plans for a sewage disposal plant for the Jennie Clarkson Home for Children at Valhalla were filed with the Department, and on September 7th were approved.

WATERFORD

NORTH SIDE SEWER DISTRICT

Plans were submitted during the year for a system of sewers for the north side sewer district in the town of Waterford, Saratoga county.

After the plans had been returned for correction, they were approved on April 18th by the State Comissioner of Health. On April 18th a permit for the discharge of untreated sewage was issued as follows:

April 18, 1906.

Permit for the discharge of sewage from a system of sewers for the north side sewer district of the town of Waterford, Saratoga county, N. Y.:

The plans of a sewer system for the north side sewer district of the town of Waterford having been approved by the State Department of Health, and the board of sewer commissioners, sewer district 2, town of Waterford, N. Y., having made application to this Department as provided by section 76 of the Public Health Law, as amended by chapter 468 of the Laws of 1903, for a permit to discharge sewage from the said sewer system directly into the waters of the Mohawk river without treatment, and it appearing after giving the matter careful consideration, that if the said sewer district is obliged to construct a sewage disposal plant at this time, it is liable to defeat the entire project for the construction of the said sewer system, and also that it will take some time to prepare the plans for a sewage disposal plant, and secure site for the same.

Now, therefore, in consideration of the above facts, and in consideration of the full and faithful compliance on the part of the board of sewer commissioners, sewer district 2, town of Water-

ford, N. Y., with the terms and conditions under which this permit is granted, permission is hereby given the board of sewer commissioners, sewer district 2, town of Waterford, N. Y., or the public authorities having by law charge of the said sewer system to sewer directly into the Mohawk river, in accordance with the plans heretofore approved by the Department, on the following terms:

First. This permit is given in consideration of the agreement on the part of the board of sewer commissioners, sewer district 2, town of Waterford, N. Y., that they will, within a period of three years from date hereof, begin the construction of a sewage disposal system in accordance with plans to be approved by this Department, and that they will, within a period of four years from date, prepare, construct and equip in a thorough manner a complete system ready for use.

Second. This permit shall be limited to the period set forth in condition number one, and shall be revocable at any time by the said Commissioner of Health, or subject to modification or change, if, in the judgment of the said Commissioner of Health, the terms and conditions under which this permit is granted are not being faithfully complied with.

Third. If at any time previous to the construction of the sewage disposal plant, arrangements shall be completed whereby the sewer system herein referred to shall be joined with that of the village of Waterford, then this agreement shall be null and void.

Fourth. The granting of this permit shall not be deemed to affect in any way the action by this Department in any future application that may be made for the extension of the said sewer system, or for the permission to allow the discharge of additional sewage into the said waters.

Fifth. This permit shall be and become operative and in force when duly accepted by formal resolution by the board of sewer commissioners, sewer district 2, town of Waterford, N. Y., and duly adopted, and when duly recorded in the county clerk's office of Saratoga county, N. Y.

EUGENE H. PORTER, M.D.
State Commissioner of Health

Witness: A. H. SEYMOUR, *Secretary*

At the close of the year notice had not been received by the Department that this permit had been adopted and filed according to condition number five, which action was necessary to make it operative.

WELLSBRIDGE

PERMIT

Application having been duly made as provided by section 75 of the Public Health Law, as amended by chapter 468 of the Laws of 1903, permission is hereby given to E. G. Rowley and others to discharge sewage from a private sewer system in Wellsbridge, N. Y., through Church street and a part of Main street, into the waters of the Susquehanna river at Wellsbridge, in the town of Unadilla, Otsego county, N. Y., in accordance with the plans heretofore submitted to this Department and the petition accompanying same which is now on file, under the following conditions:

This permit is revocable at any time whenever, in the judgment of the State Commissioner of Health it shall become necessary or when he shall deem it desirable that some method of sewage disposal be used in connection with the said sewer system.

EUGENE H. PORTER, M. D.,
State Commissioner of Health

ALBANY, *March* 12, 1906.

NOTE.— This permit to become operative must first be recorded in the county clerk's office of Otsego county, in which the outlet of the sewer, or in which the establishment is located.

WEST SENECA

On September 6th plans amending the original plans for sewerage and sewage disposal were approved. The report of the consulting engineer in regard to amended plans follows:

ALBANY, N. Y., *September* 6, 1906.

DR. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:—In regard to the plans for sewerage and sewage disposal of the town of West Seneca, the originals of which were ap-

proved under date of December 31, 1904, and modifications for which have been submitted recently by the town board for approval, I beg to report as follows:

The application for modification of these plans were submitted by the designing engineer on the request of the town board on August 27th. Prior to the submitting of these plans Mr. Cleveland visited West Seneca, and conferred with the town board in relation to these plans. After careful inspection and consideration of the changes proposed, he found the revision of the plans satisfactory.

In recommending the approval of the modified plans I wish to call attention to the location of the disposal plant, in reference to the possibility of its creating a nuisance to neighboring residents.

I find that the plant is rather centrally located in reference to the limits of the inhabited portion of the town, and that it is very possible in the future when this portion of the town becomes more thickly populated, sufficient odors may emanate from the plant to create a nuisance unless extreme precautions are exercised in the management thereof to avoid such odors. Since plans showing the original location of this disposal plant have already been approved it would perhaps be well, at this time to only call attention to the necessity for very careful management in the operation of the plant.

Respectfully yours,

THEODORE HORTON,
Consulting Engineer

ALBANY, N. Y., *September* 7, 1906.

MR. DENNISON FAIRCHILD, C. E., 935 *Ellicott Square, Buffalo, N. Y.:*

DEAR SIR:— I am returning you to-day by express the approved plans for the amendments to the sewerage system and sewage disposal plant for the town of West Seneca. As this plan is not in duplicate, another plan should be made at once and forwarded to this office for filing.

Regarding the location of the sewage disposal plant, our con-

sulting engineer advises me that, in recommending the approval of the modified plans, he wishes to call attention to the location of the disposal plant with reference to the possibility of its creating a nuisance to neighboring residents.

In his report on his examination of these plans he further states: "I find that the plant is rather centrally located in reference to the limits of the inhabited portion of the town, and that it is very possible in the future when this portion of the town becomes more thickly populated, sufficient odors may emanate from the plant to create a nuisance unless extreme precautions are exercised in the management thereof to avoid such odors. Since plans showing the original location of this disposal plant have already been approved, it would perhaps be well at this time to only call attention to the necessity for very careful management in the operation of the plant."

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

The following table gives a list of individual permits for the discharge of sewage and wastes issued during the year:

Individual Permits Issued During the Year Under Chapter 468, Laws of 1903.

Date.	To Whom Issued.	Location.	Waste Matter.	Discharged into.	Remarks.
Jan. 8	Minnie Brown	Oriskany Falls	Sink and wash water	Oriskany Creek.	
Jan. 11	Borden Cond. Milk Co.	Stanfordville	Wash water	Wappingers Creek.	
Feb. 22	Sheffield Farms-Slawson-Decker Co.	South Gilboa	Waste water	Beaverskill Creek.	
Mar. 5	Louis Vetter	Maltaville	Sink water	Small stream near residence.	
Mar. 28	Silver Creek Creamery Co.	Bullshead	Waste water	Wappingers Creek.	
Apr. 11	G. M. Corning	Rye	Sewage	Blind Brook	Permit revocable when village sewers are put in so as to allow of his connecting with village sewer system.
Apr. 16	Haverstraw Dyeing Co.	Haverstraw	Wash water	Minneseango Creek.	
Apr. 16	James E. Lamb	Maltaville	Sewage	Stream on premises.	
Apr. 30	Dominie Corcoran	Mechanicville	Sewage	Tenendaha Creek	Permit revocable when village sewers are extended so as to allow him to connect with same.
May 9	C. E. Tuxill	Auburn	Sewage	City sewer system.	
May 9	Mary B. Knox	Knoxboro	Sewage	Skenendoa Creek.	
May 15	J. M. Hutchins	Norfolk	Sink and wash water	Racquette River.	
May 22	Robert E. Westcott	Phoenix Mills	Wash water from milk shipping station	Susquehanna River.	
May 22	Borden Cond. Milk Co.	Nichols	Wash water	Susquehanna River.	
May 22	Borden Cond. Milk Co.	Chatham	Wash water	Kinderhook Creek.	
May 23	Robert E. Westcott	Pulaski	Wash water from milk condensery	Salmon River.	
July 13	David Whitney & Sons	Johnsonville	Creamery waste	Hoosick River.	
Aug. 23	Fenimore Knitting Mills	Phoenix Mills	Sewage	Susquehanna River	Permit issued for one year.
Aug. 23	McDermott Creamery Co.	Smyrna	Wash water	Pleasant Brook.	
Oct. 5	American Malting Co.	Buffalo	Wash water	Buffalo River.	
Oct. 10	Village Board of Trustees.	Celoron*	Sewage from private sewers	Chadakoin River	Permit issued for one year providing within that time village authorities submit plans for general sewer system.
Oct. 10	Board of Education	Falconer*	Sewage from private sewers	Chadakoin River	Permit issued for six months providing that within that time village authorities submit plans for general sewer system.
Oct. 24	International Cheese Co.	Jordan	Wash water	Jordanville Creek.	
Oct. 24	International Cheese Co.	Schuyler Lake.	Wash water	Oaks Creek.	
Oct. 24	International Cheese Co.	Laurens	Wash water	Hartwick Creek.	
Oct. 24	International Cheese Co.	West Oneonta.	Wash water	Hartwick Creek.	
Nov. 24	Empire State Dairy Co.	Windsor	Wash water from milk shipping station	Susquehanna River.	

* Cases starred are included under other headings.

I(b). GENERAL INVESTIGATIONS IN RELATION TO SEWERAGE AND SEWAGE DISPOSAL

Batavia

In the twenty-sixth annual report of the Department a review is made of the steps taken in the matter of the complaint of Hiram Swezey of Batavia up to the time of the issuance of an order by the Governor directing that an investigation be made.

Subsequent papers follow:

Schenectady, N. Y., *December* 19, 1905.

Dr. E. H. Porter, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:— In the matter of the complaint of Hiram Swezey against the village of Batavia which you recently referred to me for investigation and report, I beg to state that I arranged a hearing at Batavia on November 22d, at which hearing Mr. H. W. Conklin, attorney, of Rochester, N. Y., appeared for the complainant, and Mr. Fredd H. Dunham, attorney, of Batavia, N. Y., appeared for the village of Batavia.

I submit herewith the stenographer's notes of the hearing, from which you will see that the defendant, the village of Batavia, objected to the proceedings on the ground that the complainant, Swezey, had already filed an action with the Supreme Court for relief in this case, which action had been noticed for trial and a referee appointed, the first hearing before whom is to be given this month.

I overruled the objection in order that the facts in the case might be reported to you, including the question of jurisdiction raised by the defendant, and suggested that the attorneys file briefs on this point of jurisdiction, which both have done.

I beg to submit herewith the brief of Mr. Fredd H. Dunham, attorney for the village of Batavia, dated November 27th, asking that the proceedings be dismissed, and also the brief in reply by Mr. H. W. Conklin, attorney for Hiram Swezey, in answer thereto.

As it would clearly be idle to report on the merits of the case as developed by the investigation if you should decide that the proceedings should be dismissed, I am simply submitting at this time this question of jurisdiction for your decision. If you decide that the matter should be dismissed on the grounds claimed by the defendant, then, of course, no further report from me will be necessary. If, however, you decide to overrule the objection, I will then submit my report of investigation.

I also inclose herewith a written application from the village of Batavia, by its attorney, Mr. Fredd H. Dunham, for permission to appear before you and the Governor on my report, and you will notice that the petitioner, Hiram Swezey, by his attorney, Mr. H. W. Conklin, at the end of his brief makes a similar request. While these applications for a hearing were not submitted by either attorney with reference to the question of jurisdiction alone, I am submitting these applications to you in order that you may use them as you see fit and, if you think necessary, that you may grant them the hearing on the question of jurisdiction alone.

Should you, however, prefer to defer their hearing, and possibly also defer your determination on the matter of jurisdiction until my full report is in your hands, I will, on being so advised by you, prepare and submit my report at once.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,
Consulting Engineer

ALBANY, N. Y., *January* 31, 1906.

HON. FRANK W. HIGGINS, *Governor of the State of New York, Albany, N. Y.:*

SIR:— On November 16, 1905, I directed Professor O. H. Landreth to investigate an alleged unsanitary condition on the premises of Mr. Hiram Swezey situated in the village of Batavia, Genesee county, said to be due to the discharge of sewage from a village sewer, the conditions having been described and an investigation having been asked by the said Hiram Swezey in a petition dated September 26, 1905, and addressed to the State Board of

Health in accordance with the provisions of section 6 of the Public Health Law.

Present Status of the Investigation

Agreeable to my instructions, Professor Landreth visited Batavia on November 21 and 22, 1905, and made an examination of the local conditions concerned in the matter of which complaint was made, and as a part of such investigation he gave a public hearing at which both the complainant, Hiram Swezey, and the defendant, the village of Batavia, were represented by counsel, Mr. Henry W. Conklin appearing for Mr. Swezey and Mr. Fredd H. Dunham, village attorney, appearing for the village of Batavia.

Subsequent to the above investigation I was informed that Hon. Cuthbert W. Pound, legal adviser to Governor Higgins, had ruled that the petition should in the first instance have been addressed to the Governor, and that the order to investigate under section 6 of the Public Health Law should have been issued by the Governor. Mr. Swezey's attorney having also been so notified by Mr. Pound, a copy of the original petition of September 26th, modified in a few of its descriptive features, and also to include a statement of the reasons which led to the resubmitting of the petition, was sent to Governor Higgins under date of December 11, 1905, and an order made dated December 12, 1905, requiring me to make an examination into the alleged nuisances and report to you on or before February 1, 1906. On December 5th Attorney Conklin having informed me that in filing his amended petition to the Governor he had requested that the investigation already made should be allowed to stand, and not having been advised that the request was declined, nor having received instructions to repeat the investigations, but rather to submit a report of it, I am sending you this report of my investigation made November 21st and 22d through Professor O. H. Landreth.

The original petition in folio 9 and the amended petition in folio 11 contain the following statement of an action brought by the petitioner, Hiram Swezey, for an injunction against, and for damages arising from, the same alleged nuisance that was made the ground of the petition:

" That on or about the 26th day of February, 1902, your petitioner began an action against said village of Batavia in the Su-

preme Court in and for the county of Genesee to secure a permanent injunction against the continuance of said nuisance and for damages therefor. That said action is still pending undetermined. That other actions have been and still are pending against said village on account of nuisances created by it upon other premises by the discharge from the same sewers as those which affect your petitioner's said premises. That one of said actions was brought to trial and the taking of evidence was begun therein before a referee in the month of May, 1904. That in order if possible to avoid the expense of litigation your petitioner has hitherto refrained from forcing his said action against said village to trial in the hope that by the determination of said prior action the question would be settled and said village would be led to discontinue said nuisance. That the trial of said former action has been greatly delayed and that, as your petitioner is informed and believes, the same has not yet been submitted or decided."

At the opening of the public hearing in Batavia on November 22d the attorney for the village of Batavia stated that the above-named action had been noticed for trial at the term of the Supreme Court appointed to be held in Genesee county on November 13, 1905, and that by a stipulation between the attorneys the same had been referred to Hon. William Carter of Livingston county, N. Y., as referee, and by a stipulation between the attorneys a hearing on said action had been appointed for December 19, 1905. On these facts, conceded by the attorney for the petitioner, the attorney for the village of Batavia moved to dismiss the proceedings for an investigation on the ground that the matters at issue were at issue in the action pending in the Supreme Court, and that the Department of Health had no jurisdiction of the facts under those circumstances. The motion was denied, not on the grounds of the merits of the question of jurisdiction, but in order that the facts to be discovered by the investigation and the question of jurisdiction itself might come before me for determination. It was suggested, however, to the attorneys that the presentation of the arguments on the question of jurisdiction should be made a matter of record in order that they might be passed on by the State Commissioner of Health or by the Governor as a primary question. Accordingly briefs were filed by both attorneys on the ques-

tion of jurisdiction, and these briefs were submitted to me, with Professor Landreth's former report, on December 19th, hereafter mentioned. After returning from Batavia, I verbally directed him to submit his report only so far as it covered the question of jurisdiction above mentioned, and accordingly on December 19th he submitted to me his preliminary report on the question of jurisdiction raised by the attorney for the village of Batavia, transmitting also the stenographer's notes of the entire hearing, and also the briefs filed with him subsequent to the hearing on the question of jurisdiction.

On January 26th I directed him to submit a full report of the matter on the merits of the complaint as to the alleged nuisance, the submission of the question as to the jurisdiction of the Department or the Governor having already been made on December 19th.

Results of the Examination Into the Alleged Nuisance

Batavia is a village originally incorporated in 1823 and has a present population of about ten thousand people. Although the village is situated immediately on the banks of Tonawanda creek, which discharges into Niagara river, certain portions of the village, particularly the eastern and northeastern, have natural drainage to the east and ultimately into the Genesee river.

The village has no regular sewer system yet constructed, but there are a number of sewers in the streets, some of which have been constructed and maintained by the village, some of which were constructed initially by private parties but subsequently used and maintained as public sewers, and still others originally built and still maintained as private sewers. The sewers in question which are the cause of the alleged nuisance belong to the first and second classes. One of these is situated on East Main street and extends from the vicinity of Harvester avenue easterly along East Main street for a distance of about sixteen hundred (1,600) feet to the lands of the petitioner, which lie on the north side of East Main street. At this point the sewer leaves the street and passes just inside of the lands of the petitioner, where it terminates and discharges into an open ditch, which would not exist but for the discharge of this sewer. This ditch carrying the sewage flows within the lands of the petitioner for a distance of about seven

hundred (700) feet, where it joins the larger ditch, called in the testimony given at the hearing "the Big Ditch." This big ditch originates in the northern portion of the village in the vicinity of Vine street and Walker place, and carries not only surface water but also a considerable amount of sewage from street sewers, private sewers, and probably also from the large union school on Ross street. It flows easterly to the west line of the lands of the petitioner, which it enters and traverses for a distance of about eight hundred (800) feet, where it is joined by the smaller ditch receiving the sewage from East Main street, before mentioned. Continuing within the lands of the petitioner, the ditch then flows easterly for about two hundred (200) feet, thence northerly for about four hundred and fifty (450) feet, where it turns and leaves the lands of the petitioner. The total length of both ditches within the petitioner's land is thus about twenty-one hundred (2,100) feet.

A critical examination of both of these ditches at frequent points along their entire length, not only within the lands of the petitioner, but on the big ditch upstream from the lands of the petitioner, was made during the examination. Thus examination showed, not only by inspection of the water itself, but also by the deposit on the two banks of the ditches, that sewage in large amounts was being discharged into both ditches, the two carrying apparently about the same amount of sewage, but the larger proportion of water in the big ditch rendered its condition somewhat less rank than in the smaller ditch from East Main street. The smaller ditch carrying the sewage from East Main street, and the big ditch after the junction of the two, follow the general direction of East Main street and Clinton street, and at a distance at no point more than four hundred (400) feet, and varying from that to ten (10) feet. At the time of the examination the temperature was below freezing and the odors from the sewage in the ditch were not noticeable for more than a few feet away, but the evidence of witnesses taken at the hearing indicates that the odors are perceptible not only by persons passing along the street, but by residents situated a considerable distance west of the petitioner's property on Main street. From the examination of the ditches made at the time, I do not see how they could fail to be a source of strongly objectionable odors during warm weather.

The minutes of the hearing show the testimony of the various witnesses on the condition of the ditches in question.

The conditions found to exist within the property of the petitioner, caused by the presence of sewage in the two ditches, clearly constituted, in my mind, both a private and a public nuisance and a menace to public health.

As to the responsibility of the village of Batavia for the discharge of sewage into the ditches in question and for the sanitary conditions arising therefrom on the premises of the petitioner which lie within the corporate limits of the village, it should be said that the present special charter of the village of Batavia was enacted by the Legislature as chapter 195 of the Laws of 1884, and, so far as the charter relates to the authority and responsibility of the village government over sewerage and any unsanitary conditions relating thereto, no subsequent amendments have been enacted. The provisions of the charter relating to these matters will be found on pages 93 to 96 of the minutes of the hearing on November 22d. A reference to section 4 of title 4 shows that the village trustees not only have the authority to enforce all necessary sanitary measures of said village, but may determine upon view and upon testimony of witnesses whether any sewer is a nuisance, and have the authority to abate the same.

Section 3 of title VI reads:

"The said trustees shall have power to make, maintain, keep, repair and from time to time cleanse all necessary drains, ditches and sewers in the streets and alleys of said village and defray the expenses thereof out of the highway taxes; they shall also have jurisdiction and control over all the drains, ditches and sewers within said village, whether in or upon the streets and alleys thereof or elsewhere, and may in their discretion cause the same or any of them, or any part thereof to be kept in repair, and from time to time cleansed, and the expense thereof paid out of the highway taxes or other moneys belonging to said village. They may also in their discretion, require all owners or occupants of any lands or lots whereon any such drains, ditch or sewer, or any part thereof is or shall be situated from time to time to repair and cleanse the same upon the respective premises as shall be directed by the trustee."

Section 8 of title IV reads:

"Said trustees shall have power to enforce all provisions of this act, and all rules, regulations, ordinances and by-laws of them enacted, or ordinances in pursuance of the powers conferred upon them by this act by enacting the penalties to be incurred for each year every violation of the same, not exceeding $100 for any offence to be recovered with costs in an action in the corporate name of said village in the court having cognizance thereof," etc.

Article V of the ordinances of the village of Batavia contains the following:

"Section 1. No connection shall be made with any pipe sewer without a permit from the corporation clerk and upon written application stating the location of the premises named, the owner, size of the pipe connection, the number of buildings to be connected and how the same are occupied."

That the trustees recognized and exercised the above authority is shown by the evidence given at the hearing and they issued permits for sewer connections and that they regularly authorized the cleaning of the drains into which the sewers discharged. That they were cognizant of the existence of the discharge of sewage from the village sewers upon the lands of the petitioner is indicated by the written notice served by the petitioner on the trustees on April 29, 1901, given in the evidence of H. E. Swezey on page 138, and also by the alleged article of agreement shown on page 147 between the village trustees and Jerome Thompson, the prior owner of the Swezey property. This agreement, while it plainly shows an admission of the responsibility on the part of the trustees for the construction and use of the sewer thus discharged on the lands of the petitioner, appears to fall short of a binding agreement in that, as shown by the evidence of the petitioner on page 156 of the minutes, the deed for the property has been made and delivered to Hiram Swezey by Jerome Thompson on March 2, 1882, whereas the alleged agreement between Jerome Thompson and the trustees was dated March 11, 1882, or more than a week after Thompson had conveyed the property to Swezey.

Outside the matter of this particular complaint of conditions on the premises of the petitioner, the matter of sewerage and water supply throughout many portions of the village are in an

extremely unsanitary condition. As has been before stated, the village has no regular sewer system, and it virtually has no public water system, since the source of public water supply is so badly polluted as to be a source of great danger to those who use it, and those who do not use it are forced to continue the use of wells, many of which are exposed to serious danger of pollution, and are known to be polluted, from adjacent cesspools and privy vaults made necessary by the absence of a sewer system. The sewage discharged from the few portions of the village which are provided with sewerage, having no proper place of discharge or disposal, it is a source of danger and inconvenience to other portions of the village through which the sewage is allowed to flow in open ditches, as in the case of the present petitioner. The Department has been burdened with complaints arising from the above unsanitary conditions in Batavia for many years past, and and has used its best effeorts to endeavor to bring about an improvement, primarily in the sewerage system, and following that in its water supply. The proposition to construct a sewer system has repeatedly been before the village authorities for consideration, but the fact that a considerable number of the larger taxpayers have individual sewerage accommodations which meet their individual interests has been in part a reason that a proper sewer system has not been authorized. A proposition to construct a sewer system on carefully prepared plans was voted down at a village election held in October, 1902, partly owing to the above reason that a portion of its population are satisfied with their present individual sewerage accommodations, and partly because the taxpayers were not sufficiently well informed as to the plans on which they were asked to vote. Another set of plans for a complete, though a different, system of sewerage is now before this Department for approval, and if found to be as suitable for the village, both on sanitary and financial grounds will doubtless be approved. In any event the difficulty has not been that the village cannot be sewered, but that the citizens are unwilling to assume the expense.

Conclusion

In my opinion, the proper and most suitable remedy and solution of not only the difficulty in the case of the present peti-

tioner, but also in the case of numerous other portions of the village which are now in unsanitary conditions, would be the immediate construction of a comprehensive sewer system for the village. Any other remedy for rectifying the conditions on the Swezey property, such as that of enclosing the ditches in closed pipe carried through the lands of the petitioner, would simply result in transferring the nuisance to property further downstream, since the sewage which is now deposited on the Swezey property would then be deposited on the lands where the closed sewer terminated.

If, therefore, on the question of jurisdiction which is now at issue, it should be decided that the Department has jurisdiction in the present case, I beg to recommend:

First. That the conditions shown to exist on the lands of the petitioner, Swezey, be declared as constituting both a public and private nuisance and a menace to public health;

Second. That the municipal government of the village of Batavia be declared responsible for the maintaining of the nuisance;

Third. That a mandatory order be issued in accordance with the provisions of section 6 of the Public Health Law, directing the village officials of Batavia to abate the existing conditions on the lands of the petitioner, and that, if the manner of abatement be stipuated or suggested in the order, it be the prompt construction of a complete and comprehensive system of sewerage in accordance with plans already approved or to be approved by this Department.

I beg to send herewith the several papers in the case and to call attention to the written applications heretofore received from the attorneys of both parties in this proceeding that they be given an opportunity to be heard by me and by the Governor on the question of jurisdiction of the Department in this matter, and also to call attention to the written briefs of both attorneys already submitted on this question.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

BROWNVILLE

In response to several inquiries from the authorities at Brownville, Jefferson county, in relation to the establishment of a sewer system and to the discharge of sewage into the Black river, the following communications were addressed to the village authorities:

ALBANY, N. Y., *February* 6, 1906.

Mr. CHARLES G. HART, *President, Board of Health, Brownville, N. Y.:*

DEAR SIR:— Replying to your letter of February 5th, regarding the establishment of a sewer system in your village, if you will refer to article X of the Village Law, you will find the procedure which is necessary to follow in order to construct a sewer system.

You will note from the sections contained in this act, that the plans for any sewer system must be approved by this Department, and also that a sewer may be constructed at the expense of the village, at the joint expense of the village and the property benefited, and also wholly at the expense of the property benefited.

It is not necessary under these provisions for you to construct your entire system at once, but as provided therein you should have a map or plan of your system prepared; you can then construct such portion of it as you desire, and add to same from time to time, and when the system is completed, you will have a perfect system based on a general plan prepared in advance.

If the conditions in your village are as bad as the complaints would seem to indicate, some action should be taken at once, and I would advise that the board of health urge upon the trustees the importance of adopting a plan for a sewer system, and proceeding to construct such part of the system as is necessary at this time.

No funds are provided this Department for engineers to do this work for villages, it must be done at their own expense, but is subject, however, to the approval of this Department.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

AMSTERDAM, N. Y., *August* 1, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In regard to inquiries from Mr. J. J. Warner, president of the village of Brownville, Jefferson county, and from Mr. Henry E. Baker of Watertown, engineer for the village, as to whether the Department of Health would approve plans for sewers for Brownville not including a sewage disposal plant, which matter was recently referred to me for investigation, I beg to report as follows:

At a conference with Engineer Baker I learned that the village of Brownville is desirous of constructing a water supply system and a sewer system for the village and wish to defer the construction of a sewer disposal plant until a later date.

Brownville, with a population of about 700, is situated on the Black river, four miles below Watertown. The nearest village below is Dexter, with a population of 1,000. The river down stream from Brownville is not used as a potable water supply.

I would suggest that when a sewer system is designed for either of these two villages that a plan for concentration of sewage at one point and for sewage purification be worked out and that permission be granted to defer the construction of the disposal plant until some later date at the discretion of the State Commissioner of Health.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

ALBANY, N. Y., *August* 10, 1906.

MR. J. J. WARNER, *President of the Village, Brownville, N. Y.:*

DEAR SIR:— Regarding the matter of your application to discharge the sewage from the village of Brownville into the Black river,— one of our engineers has made an inspection of the local conditions and has reported thereon to me.

As a result of his examination, you are advised that plans for the sewer system for the village should be accompanied by plans for a sewage disposal plant and if, after these plans have been

approved, you deem it advisable to make an application to defer the construction of the sewage purification plant until some future time, I will be glad to take the matter up.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

BRIARCLIFF FARMS, WESTCHESTER COUNTY

In response to requests an investigation was made at Briarcliff Farms, Westchester county, as noted in the following report:

SCHENECTADY, N. Y., *March* 12, 1906.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health:*

DEAR SIR:— In accordance with instructions received verbally from you on March 8th, I visited on March 10th Briarcliff Farms in Westchester county. I was escorted from Ossining to the office of the estate of Briarcliff, where I met Mr. Walter Law, Jr., son of the absent owner; A. J. Provost, consulting engineer for Dr. Lederle, and two other gentlemen, all of whom accompanied me on the inspection of the ground.

The aid which Mr. Law is seeking from the Department is in the nature of information and advice, as will be pointed out in the course of the report. The accompanying map was furnished by Mr. Law. The report follows:

Briarcliff Farms is the estate of Walter W. Law, situated in Westchester county, in the Highlands, about three miles southeast of Ossining. It comprises in all about 6,000 acres, part of which is devoted to dairy farm purposes, the remainder being a restricted residence section. This residence section, which also comprises two schools and a hotel, the office and industrial plants of the estate, lies almost entirely within the watershed of Pocantico creek, which in turn is one of the direct feeders for the reservoir which supplies North Tarrytown with drinking water.

The population of this residence district at present is a trifle under 550, but a rapid growth is anticipated, the population being expected to double within four years. The population is

practically uniform throughout the year, the schools being utilized as hotels during the summer months.

The accompanying blue-print shows the existing drainage system, and indicates the proposed plans for extending it. It is the desire of the owners to anticipate the actual growth of the community, and to prepare now, once for all, a sewerage system which shall be permanent, adequate for a greatly enlarged population, and which will merit the approval of the State Department then as well as now. To obtain a permanent solution, even at greatly increased present cost, is the expressed desire of the owners; and with this end in view they present two alternatives for your consideration, desiring that the Department recommend the one likely to gain the more lasting approval of the Department.

The Present Sewage System

Looking at the blue-print map, you will notice that there are at present five individual sewer lines in use, leading to as many septic tanks, viz.: A, B, C, D, E. Of these four are in the drainage basin of Pocantico river, and one (septic tank A) is in another basin which, however, leads also to the North Tarrytown reservoir. Septic tank A is at present supplemented with contact-filter beds, the effluent from the latter reaching the adjoining stream slowly by percolation through a fine sandy soil. The other four septic tanks (B, C, D and E) discharge their effluent through a line of porous tile pipe, whence it is "absorbed" by the fine sandy soil, the water eventually seeping into the Pocantico river. The community will outgrow the present system of disposal, and there are now under course of construction, a septic tank at point shown as "proposed septic tank," and a trunk sewer from this point to the point near Buckhouts Corners, marked "pump."

It is intended that the 150,000-gallon septic tank, now under construction, shall receive the sewage from septic tanks A, B, C and E, or from B, C and E only, as seems most desirable. After treatment in the 150,000-gallon tank, the sewage will flow through the 15-inch trunk sewer, 3,400 feet to the point marked "pump," having been joined by the effluent from the present tank D, which will be retained in constant operation.

At this point ("pump") then, is concentrated the sewage of the entire community, septically treated.

From this point two alternative methods are offered for completing the disposal:

(1) *Filter Beds for Septic Sewage*

At the point marked "pump," the sewage may be forced by pumping through a thirty-foot lift upon a knoll across the stream. This knoll is composed entirely of sand and gravel and can readily be adapted so as to form two contact-filter beds, each with 75,000 square feet of surface. These would each be divided to permit of cleaning, proper regulation, etc. The two beds would be upon different levels. The sewage would be pumped to the level of the higher filter and distributed by shallow surface trenches, about ten feet apart. The higher filter would be under-drained at a depth of four feet, by tile drains every fifteen feet leading to a single main which would discharge upon the surface of the lower filter. Seepage from the lower filter would find its way to the stream.

(2) *Trunk Sewer*

The alternative method provides for the continuation of the pipe line from the point marked "pump" to a point in the stream below the reservoir of North Tarrytown, as a trunk sewer discharging the septic effluent without further treatment. This would require about two miles of pipe line carried at a slight elevation above the stream (the valley is very narrow below the filter-bed site), and probably at no point within fifty feet of it; thence carried around the reservoir and allowed to discharge at a point below the dam into the stream with a sudden fall of from sixty to seventy feet. This is regarded by Dr. Lederle and Mr. Provost as the more satisfactory permanent solution of the question, and will be carried out by Mr. Law if the Department recommends it.

Mr. Law will approach the village of North Tarrytown to seek their aid in a financial way toward carrying out the work, if this trunk sewer alternative is decided upon. First, however, he desires to be informed by the Department whether or not, under

the law he can claim the aid of North Tarrytown. He stated that counsel had advised him that under section 72, article V, of the Public Health Law, such aid might be claimed with the assistance of the Department. If such aid is obtainable, he desires further to know the extent of the work for which North Tarrytown would be properly chargeable.

Summary

Upon consideration of the general features of existing conditions and problems presented, the aim of Mr. Law is to obtain an expression from the Department in regard to these two questions:

(1) Which alternative does the State Department of Health indorse as the more satisfactory and permanent method of sewering Briarcliff Farms?

(2) Can financial aid be claimed under the law from North Tarrytown; if so, to what (geographic) extent can it be claimed?

I enclose the letter of the Commissioner to you, dated February 28th, and append a blue-print map as an exhibit to accompany this report.

Respectfully submitted,

ERIC T. KING,
Inspecting Engineer on Water Supply

On April 3d a conference was held at the Department office between the Commissioner and the parties interested in the sewer in question.

De Kalb Junction

In response to a request for advice in the matter of a nuisance caused by an open ditch in the town of De Kalb, St. Lawrence county, an investigation was made and the recommendations are found in the following report:

Schenectady, N. Y., *February* 10, 1906.

Dr. E. H. Porter, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:— I beg to submit the following report on the alleged unsanitary conditions existing in the village of De Kalb

Junction, St. Lawrence county, due to the overflow or backing up of a sewer or drain which extends through the village.

Agreeable to your instructions, I directed Mr. H. B. Cleveland, inspecting engineer on sewers and sewage disposal, to visit De Kalb Junction and to make a critical examination of the local conditions. His report of this examination is herewith inclosed, as is also the preliminary correspondence between the Department and the local officials, which correspondence was referred to me for examination.

The points on which this Department is asked to aid the local officials by advice or direction are:

(1) What are the proper steps to be taken by the town board to ensure the sewer or drain being put in proper sanitary condition?

(2) What action should be taken by the board of health in the matter of cesspools throughout the village?

On the first question, Mr. Cleveland's report indicates that the sewer or drain has been a natural watercourse, and has flowed through the property of the party making the complaint for at least twenty years. The drain, however, appears to be either of insufficient capacity or to be obstructed, so that there results in time of wet weather a backing up of the polluted water from the drain, producing unsanitary conditions in the cellar of the person making the complaint. While it would thus appear that the sewer or drain is rightfully flowing as it does, there is no question but that the backing up and flooding of property is improper and interference with property rights, and should be abated as a sanitary nuisance in this case, by any and all parties who cause the obstruction or who contribute to it.

While Mr. Cleveland's report is complete as to all points of information which were available to him on his inspection, he did not, and naturally could not, determine — unless he happened to be there during a storm — just where the particular obstructions lie which cause the backing up of the drain. As the immediate jurisdiction of this matter clearly lies with the town board acting as a town board of health, it would seem proper for them to first determine on whose premises the obstruction or obstructions to the

free flow of the drain lie, and then to issue and enforce orders against the party or parties responsible for such obstructions. In reaching a conclusion as to the identity of the persons responsible for the obstruction of the drain the town board of health may find it necessary to secure the services of an engineer to run levels, gauge the flow or determine the slope of the stream at different points, and to advise them as to where the cause or the causes of the flooding or backing up of the drain are located.

Should it be found that a general reconstruction of the sewer or drain will be necessary, the provisions of chapter 348 of the Laws of 1901, which provide for sewers outside of incorporated villages, may perhaps, be profitably utilized by the town board of health, but, if so used, the plans for such sewers should be made sufficiently comprehensive to ultimately provide for the sewering of the entire village, even though only the one sewer now under consideration is to be constructed at present.

On the second question, relating to the matter of cesspools in relation to wells, it would appear that section 2 of the Orders and Sanitary Regulations adopted by the town board of health would adequately cover the case of the threatened or suspected pollution of wells by cesspools. The danger of such infection is, of course, very great, and in the absence of sewers dry earth closets are much to be preferred on sanitary grounds.

Clearly, the most thorough and effective remedy for both the above two bad conditions would be for the town board to establish a sewer district in accordance with the law above cited; to have plans prepared for a sewer system covering the entire village; and to have the same submitted to this Department for approval, after which as many sewers might be built as are desired. With such sewers constructed, the town board could enforce the provisions of the latter part of section 3 of the Orders and Sanitary Regulations of the local board, and require such premises to be connected with the sewers as the board might consider essential to maintain the purity of wells, or other desirable sanitary condition.

The above are my recommendations on the matter.

I am, dear sir, very truly yours,

OLIN H. LANDRETH,
Consulting Engineer

ALBANY, N. Y., *February* 15, 1906.

DR. E. M. COLE, *Health Officer, De Kalb Junction, N. Y.:*

DEAR SIR.— Enclosed herewith you will find a copy of the report of the consulting engineer of this Department on the recent examination of alleged unsanitary conditions in your village.

I would urge that you lay this report before your board of health, and go over the same carefully, particularly the recommendations contained therein, which I endorse.

Kindly advise me what action is taken by your board.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health.

FALCONER

On August 16th an application was received by the Department from the board of education of Union free school district No. 6, of the town of Ellicott, Chautauqua county, for the issuance of a permit for the necessary increase in the discharge of sewage into the outlet of Chautauqua lake, otherwise known as the Chadakoin river, to be caused by the proposed extension of a sewer owned by Charles F. Fitch and others. The schoolhouses which the proposed extension is to serve are located in the village of Falconer.

The question of sewers for the village of Falconer is treated in the 26th annual report, page 622. This petition was accompanied by supporting petitions from the board of health of the village of Falconer and the village trustees.

A report of the consulting engineer follows:

ALBANY, N. Y., *September* 14, 1906.

EUGENE H. PORTER, M. D., *State Department of Health, Albany, N. Y.:*

DEAR SIR:—In regard to the application of the village officials of Falconer to extend a private sewer in said village to serve the schoolhouses in school district No. 6, which application dated August 29, 1906, sets forth the condition of such private sewer extension, I beg to report as follows:

It appears from the application, the correspondence on file in this office, and from the president of the school board during a visit at this office on September 12th, that there is no sewerage system within the village, and that no comprehensive plan has as yet been prepared for such a system. It is explained that the proposed plan of extending the present private sewer to include the school district is more economical than the construction of cesspools or other small disposal plant for the present 400 pupils. This is unquestionably so, but it involves the question of propriety of discharging additional unpurified sewage into Chadakoin river.

Without visiting the locality, it appears from the information now available that the discharge of this small amount of sewage for a population of 400 to 600 pupils into Chadakoin river would not seriously pollute the stream under present conditions or for a reasonable period in the future.

The question is, however, involved with that of sewage discharge from the city of Jamestown and the village of Celoron. In fact, an application has only recently been submitted by the village of Celoron to discharge sewage from a small and inadequate system of private sewers within that town. Further, there is a complaint from residents below Falconer, where the Jamestown outfall sewer discharges, in regard to the pollution of Chadakoin river in this vicinity.

It appears that the resident population upon the watershed at Falconer is about 30,000 persons, about 25,000 of which reside in the locality of Jamestown, probably 20,000 of which are connected with sewers that discharge into Lake Chautauqua or Chadakoin river. The summer flow of the river during dry season is probably not more than 100 cubic feet per second, which amount would safely care for a population of from 20,000 to 25,000 persons.

It appears that a population of about this number has now been reached upon the watershed which directly pollutes this stream, and that the time has now come when these cities and villages should be required to cease polluting these waters and construct sewage disposal plants.

In view of the above, I recommend:

First. That steps be taken to have the city of Jamestown purify its sewage before discharging it into Chadakoin river, giving a

reasonable period for preparation of plans and the construction of purification works;

Second. That the village of Falconer be required to prepare plans and construct a system of sewers for the entire village. In the meantime, I consider it appropriate to approve their application of August 29th to discharge from School No. 6 into Chadakoin river through proposed private sewer for a limited period of, say, one or two years; recommending that, in the meantime, plans for a system of sewage disposal be prepared by the village and submitted to this Department at an early date;

Third. That the village of Celoron be granted permission to discharge sewage from the private sewers described in their undated report, received about June 27, 1906, for a limited period of, say, one or two years, and that the village be requested in the meantime to prepare plans for an adequate system of sewers and sewage disposal for the village.

Attention of the village authorities of Celoron should be called to the unsatisfactory layout of the present system of private sewers submitted with their application, and I should recommend that the present permit be granted by this Department only as a temporary expedient, while plans are being prepared for an adequate system of sewers which can be properly extended to meet the requirements of the growth of the village in the future.

Respectfully submitted,

THEODORE HORTON,
Consulting Engineer

ALBANY, N. Y., *October* 10, 1906.

MR. WALTER H. EDSON, *President Board of Education, Falconer, N. Y.:*

DEAR SIR:— In the matter of the application of the board of education of union free school district No. 6 of the town of Ellicott, Chautauqua county, for permission to construct a sewer, which said application was endorsed by the board of trustees and the board of health of the village of Falconer, I have given this matter my careful consideration and have noted carefully your statements with reference to the same.

As I intimated to you in my letter of September 20th, I believe that a better way for you to secure proper sewerage facilities would be by having a plan for a sewer system for the village designed by a competent engineer and submitted to this Department for approval.

Under the provisions of the Village Law, you can then construct such portion of the system as may be deemed necessary. In this manner, when the system is completed, you have a sewer system built upon a prearranged plan, and I believe it to be far more economical than to construct private sewers which may possibly have to be abandoned when a village sewer system is constructed.

You also gain the advantage of having the sewers under the control of the proper municipal authorities.

In view of the circumstances of this case and the apparent urgent necessity for providing sewer facilities, I have decided to grant you a permit, which is herewith inclosed to you. This permit is granted in view only of the urgent need of this sewer at the present time, as set forth in your letters of September 14 and October 4, 1906; and your attention is especially called to the provisions of the said permit.

The permit has been issued for the period of six months provided that, within that period, the board of trustees of the village of Falconer shall have a plan for an adequate system of sewers for the village prepared and submit the same to this Department for approval, as required by article X of the Village Law.

It is to be hoped that, with the urgent need for improved sewerage facilities now existing in your village, not only with respect to the case in question but to the village as a whole, the village board of trustees will take steps at once to have plans prepared for such a complete system of sewers for the village, and that an application accompanied by the plans will be duly submitted within the period stated in the permit. I trust that the board of education, as well as the board of health, appreciating as you no doubt do the importance of proper sewer facilities from a sanitary standpoint, will do its share in urging upon the board of trustees and the village as a whole that these steps be taken without delay, as the permit requires shall be done.

Copies of the permit will be forwarded to the village clerk and to the board of health for filing, as required by law.

I trust that this manner of meeting the situation will meet with your approval, and I assure you that this Department will be very glad to render you any assistance in its power in this important matter.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

On October 10th a permit was issued with the following conditions:

I. This permit is granted for a period of six months provided that within this period an application, accompanied by plans for an adequate system of sewers for the village of Falconer, in which the proposed eight-inch sewer shall be included and form a part thereof, shall be submitted by said village board of trustees of Falconer to this Department for approval, as required by article X of the Village Law.

II. This permit shall be revocable at any time by the State Commissioner of Health, or subject to modification or change if in the judgment of the said Commissioner it shall become necessary or desirable; and the granting of this permit shall not be deemed to affect in any way action by this Department on any future applications that may be made for permission to allow the discharge of additional sewage into the waters of this State.

NOTE.— This permit to become operative must first be recorded in the county clerk's office of Chautauqua county, in which the outlet of the sewer, or in which the establishment is located.

HARRISON

In response to a request from the village authorities, an investigation was made with respect to the pollution of Beaver Brook in that village and to the question of sewerage in the southerly section of the village. The report of the consulting engineer follows:

ALBANY, N. Y., *December* 17, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In the matter of the pollution of the small tributary of Beaver brook which flows through the southerly section of the village of Harrison, Westchester county, and the application of L. E. Peeler, M. D., of Harrison to make certain improvements along the lower course of said channel by the construction of a drain discharging into Beaver brook, I beg to report as follows:

On December 14th I visited Harrison and in company with L. E. Peeler, M. D., health officer of Harrison, made an inspection of the conditions of the pollution of this tributary of Beaver brook. I also discussed with him, members of the local board of health and other officials of the town various methods for improving the sanitary condition of this stream, more particularly the question of general sewerage for the southerly portion of the town.

The small tributary referred to runs through the central part of the village of Harrison in a covered stone channel built many years ago, and is now in places in a dilapidated condition. The stream is fed by springs and in its course through the village receives direct or indirect pollution from some fifteen or twenty houses which are upon the small watershed. The stream in its lower section, especially just east of the Harrison town line, traverses a flat, marshy piece of land which is frequently overflowed, and as a result of this condition of the stream the highly polluted water overflows the marsh at times and creates a nuisance, especially in summertime.

A portion of the drainage area of the small tributary lies in the village of Rye and also received, through smaller covered or blind drains, pollution from other houses situated in this village. In other words, the town of Harrison and the village of Rye are both parties to the contamination of this small tributary and residents of both municipalities suffer from the nuisance created. It is claimed that the immediate and worst nuisance is from the section of the stream which flows openly through the low marshy ground above referred to which adjoins Park street, and the remedy proposed at this time by the board of health and for which applica-

tion was made by Dr. Peeler, health officer, is to cut a deep channel through the swamp referred to in order to drain the swamp land and to reconstruct the present stone-covered drains which are now in a dilapidated condition.

From information gathered during my visit and from a study of the general situation it appears:

1. That a nuisance is created along the small tributary of Beaver brook as a result of the discharge into it, either directly or indirectly, of sewage from houses situated in the town of Harrison and village of Rye. This nuisance is worst near the low, marshy area in the village of Rye near Park street, where the polluted waters of the brook are exposed by flooding and give rise to odors of sewage decomposition.

2. That the portions of the town of Harrison and the village of Rye, having a present population of about 1,500, are in need of sewerage facilities at the present time.

3. That the village of Rye has now under consideration plans for sewerage and sewage disposal which, if carried out, it is expected will remove the pollution of this village.

4. That these portions of the village of Rye and Town of Harrison, known as the Village of Harrison, form practically one community with a common interest with respect to sewerage and that the plans now being prepared by the village of Rye will include some provision for the sewage of Harrison with the end in view that joint action can be arranged between the two villages.

5. That the reconstruction of the present dilapidated stone drain would be undesirable on the grounds:

(a) That the sewage carried in it would be composed of a large volume of ground water that would have to be purified or pumped in the near future when purification or other means of disposal will be required.

(b) That the money expended for a temporary and inadequate sewer could more profitably be spent on improved sewerage that would be of lasting benefit to the majority of the residents of the village instead of to only a few through whose property this sewer would pass.

It would seem in view of the foregoing that the most practicable thing for the town of Harrison to do, in my opinion, is to con-

sider at once the matter of sewerage for the southerly section of the town, and of joint action with the village of Rye in the matter of disposal of sewage. If joint action cannot be reached by these municipalities at this time, it is very possible for Harrison to establish an independent disposal plant near Beaver brook where ample oppportunity for the construction of such a plant is apparently available, temporarily, until a time when joint action may be considered more expedient if not imperative.

Since the immediate and pressing question is the elimination of the nuisance at the low marsh tract of land just east of the town line, it would seem that this could easily be accomplished by digging a suitable channel through the swamp. This would confine the stream to a small section and prevent its spreading over the land and through decomposition giving rise to offensive odors.

In view then of the foregoing, I would recommend:

1. That permission be refused the town of Harrison to construct a sewer or drain along the course of the tributary to Beaver brook.

2. That the town of Harrison be required or induced to prepare plans and construct a system of sewers, with suitable provision for sewage disposal that will provide for not only future requirements of the town but also the elimination of the existing pollution of the small tributary of Beaver brook which now exists.

3. That the town of Harrison be advised to consider joint action with the village of Rye or Merrimack in the matter of a a sewage outfall or for sewage disposal.

4. That permission be granted the town of Harrison and village of Rye to construct a channel through the low marsh land east of the Harrison town line and to continue the discharge of the present sewage of this tributary through it into Beaver brook for a period of one year, providing that plans for a sewerage system of the portion of the town of Harrison be prepared and presented to the Department for approval within this period.

5. That if said plans for a sewerage system for a portion of the town of Harrison be not presented to this Department within the period above stated, the local boards of health of the town of Har-

rison and the village of Rye be directed to abate the nuisances which now result from the discharge of sewage into this tributary of Beaver brook.

Respectfully yours,

THEODORE HORTON,
Consulting Engineer

KINGSTON

At the request of the city authorities, an inspection of the sewage disposal plant at Kingston was made.

Reports of such inspection follow:

ITHACA, N. Y., *August* 15, 1906.

DR. EUGENE H. PORTER, *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I have to report that, in accordance with your instructions, I have visited the city of Kingston and on August 13th, inspected the sewage disposal plant of that city in company with Mr. Elking, the corporation counsel.

The conditions are briefly, an expensive and ill-designed plant. The area of the contact beds should be increased eight fold to secure satisfactory purification. With the area available the sewage leaves the beds in worse condition than when it entered, decomposition taking place in the beds. I advised Mr. Elking that a nuisance existed from the present working of the plant and that two remedies were open. One, is to construct an extension of the out-fall leading into Rondout Creek, about a mile distant. I advised him, however, that undoubtedly some method of treatment would be necessary within a short time and that such a discharge of crude sewage into a tributary of the Hudson would probably not be permitted by the State Department of Health.

The second remedy I suggested is to double the present capacity of the contact beds which could be done without great expense and change the method of application so as to make the filter a sprinkling filter. This would require only double the area and could be arranged very conveniently in this case.

Very respectfully,

H. N. OGDEN

ALBANY, *September* 13, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In regard to the alleged unsanitary operation of the sewage disposal plant at Kingston, which, according to your direction, was investigated by Mr. H. N. Ogden, I beg to transmit herewith his report upon the conditions existing there. Mr. Ogden has apparently made a careful inspection of the method of operating the plant and has concluded that the plant is not of sufficient size to effectually purify the amount of sewage tributary to it. He recommends, for relief, one of two methods: Either enlarging the plant, thereby increasing its capacity, or extending the outfall sewer to a more remote point of discharge.

In approving Mr. Ogden's report, I beg to suggest that only that method of relief by increasing the capacity of the plant be considered, since adequate purification can be effectually secured by this means, and the pollution of a tributary of the Hudson river, by extending the present outfall sewer to a more distant point, be avoided.

Respectfully submitted,

THEODORE HORTON,
Consulting Engineer

ALBANY, N. Y., *September* 17, 1906.

THOMAS ELKING, Esq., *Corporation Counsel, Kingston, N. Y.:*

DEAR SIR:— Regarding the matter of the sewage disposal plant at Kingston, which was investigated recently by one of our assistant sanitary engineers, our Consulting Engineer has only recently been able to take this matter up and go over it.

It is apparent, from the investigation which was made there, that the plant is not of sufficient size to effectually purify the amount of sewage tributary to it. Our Consulting Engineer recommends that the method of relief which should be adopted is by increasing the capacity of the plant and in this way secure adequate purification.

I would, therefore, suggest that your authorities immediately secure a plan for the addition and enlargement of your sewage

disposal plant, the plans for which, when completed, should be submitted to this Department for approval.

I shall be pleased to hear from you as to what action is taken in this matter and be glad to render you any assistance in my power.

Very respectfully,
EUGENE H. PORTER,
Commissioner of Health

Malone

As a result of receiving several applications for permits to construct private sewers in the village of Malone, the matter of plans for a general sewer system for the entire village was taken up by the Department with the village authorities.

Amsterdam, N. Y., *August* 1, 1906.

Eugene H. Porter, M.D., *Commissioner of Health, Albany, N. Y.:*

Dear Sir:— At your request, on July 27, I visited the village of Malone, Franklin county, for the purpose, as had been previously arranged between the Department of Health and the village trustees, of conferring with an engineer representing the village in reference to the designing of a general sewer system for the village.

Such a design has become necessary from the fact that in several localities sewers have become very much needed and without such a complete plan of sewerage the construction of any sewer is more or less a matter of guesswork as to its ultimate usefulness and economy.

On the afternoon of the 25th of July, I telegraphed the village clerk that I would visit Malone on the 27th, but on arriving there, found that the Engineer to represent the village, in the work of commencing the design of the sewer system, was not there to meet me. In fact the president of the village, Mr. Thomas Hines, stated that it was not yet determined what engineer would be employed to design the sewer system.

It would seem to me that the sewer system should be designed

and plans submitted to the State Department of Health for approval in the near future; and since the cost of the designing would be no more at present than at some future time and since considerable saving to the village would result from the probable construction by private parties of sewers which should correspond to and form a part of such general system, it would seem that the village could well afford to borrow the comparatively small sum necessary, if funds can be raised in no other way, and cause the general sewer design to be made. Much of the data necessary is at hand and the trustees have ample authority from the taxpayers as expressed by a recent vote on the question to take this progressive, business-like step.

Hon. F. D. Kilburn and Mr. H. D. Thompson are desirous of constructing a sewer on Macomb street at private expense, and are ready to sign an agreement with the State Department of Health that, if this sewer is constructed before a general system is planned, and, when the general system shall be installed if it shall be found to require modification or relaying, that they will make such modification or reconstruction at their own expense.

The construction of this sewer would necessitate a long outlet line which could as readily be built to serve eventually a large portion of the village if the general design should be made at once.

You are already familiar with the application for permission to construct an independent sewer known as the Bovia sewer.

Also, in a newly opened section about Elm street sewers are contemplated and should not be constructed without reference to a comprehensive, general plan.

I would recommend that you urge the village authorities to take up this question in the proper and satisfactory manner.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

ALBANY, N. Y., *October* 2, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In compliance with the request of the village

authorities of Malone, Franklin county, and at your request, I have had an Assistant Engineer of this Department visit Malone and confer with their Engineer, Mr. Dewart, in the matter of preparing plans for an adequate system of sewerage for the village.

Before making this visit I studied carefully the topography of the territory in and adjoining Malone, from plans on file in this office and outlined general features to be observed in the design of the system. Mr. Cleveland visited Malone on September 11th and went carefully over the ground with Mr. Dewart. Such information and assistance was given him as should enable him to properly design a system of sewerage for the entire city,— one which can be easily extended to meet the future growth of the village and that will provide for a collection of all the sewage at some point below the city, where it can be treated in the future when the purification works are demanded.

It is understood by Mr. Dewart that at the present time sewage disposal is not required by this Department. Although I do not know the source of this understanding, from a review of the condition existing at Malone with respect to stream flow and pollution above and below the village, I do not consider that sewage purification is necessary at the present time.

We have a record in the office of information given Mr. Dewart on the visit of September 11th for future reference. Additional assistance will, of course, be furnished in the future upon request. It is understood now, however, that surveys and plans are in progress under the direction of Mr. Dewart and that these plans will be submitted to the Department for approval at an early date. In the meantime Mr. Dewart requests that a copy of "rules and regulations for preparation of plans of sewer systems" and a copy of the last annual report of the Department be sent to him.

Respectfully submitted,

THEODORE HORTON,
Consulting Engineer

MAMARONECK

An investigation was made on January 19th of the alleged deviation, during construction, from the approved sewer plans for the village of Mamaroneck.

MEDINA

The question of completing the construction of the sewer system of the village in accordance with plans approved by the Department April 9, 1890, and proposed amendments thereto, has been brought before the Commissioner and his approval to the general proposition has been given. Detail plans showing amendments to the original plans and extensions to the system are now in course of preparation by the village authorities.

MONTOUR FALLS

ALBANY, N. Y., *June* 20, 1906.

EDWARD H. HUTTON, M.D., *Medical Expert, Corning, N. Y.:*

DEAR SIR:— This Department is in receipt of a complaint regarding the Cronk & Carrier works in the village of Montour Falls.

It is alleged that the sewage and offal about the shops are very obnoxious, and that something should be done to relieve the people from the nuisance.

Will you kindly go to Montour Falls at your earliest convenience and see the health officer, and with him make an inspection of these premises and make a report to me regarding the conditions there?

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

CORNING, N. Y., *June* 22, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I have the honor to report my investigation of the complaint in regard to the Cronk & Carrier works in the village of Montour Falls.

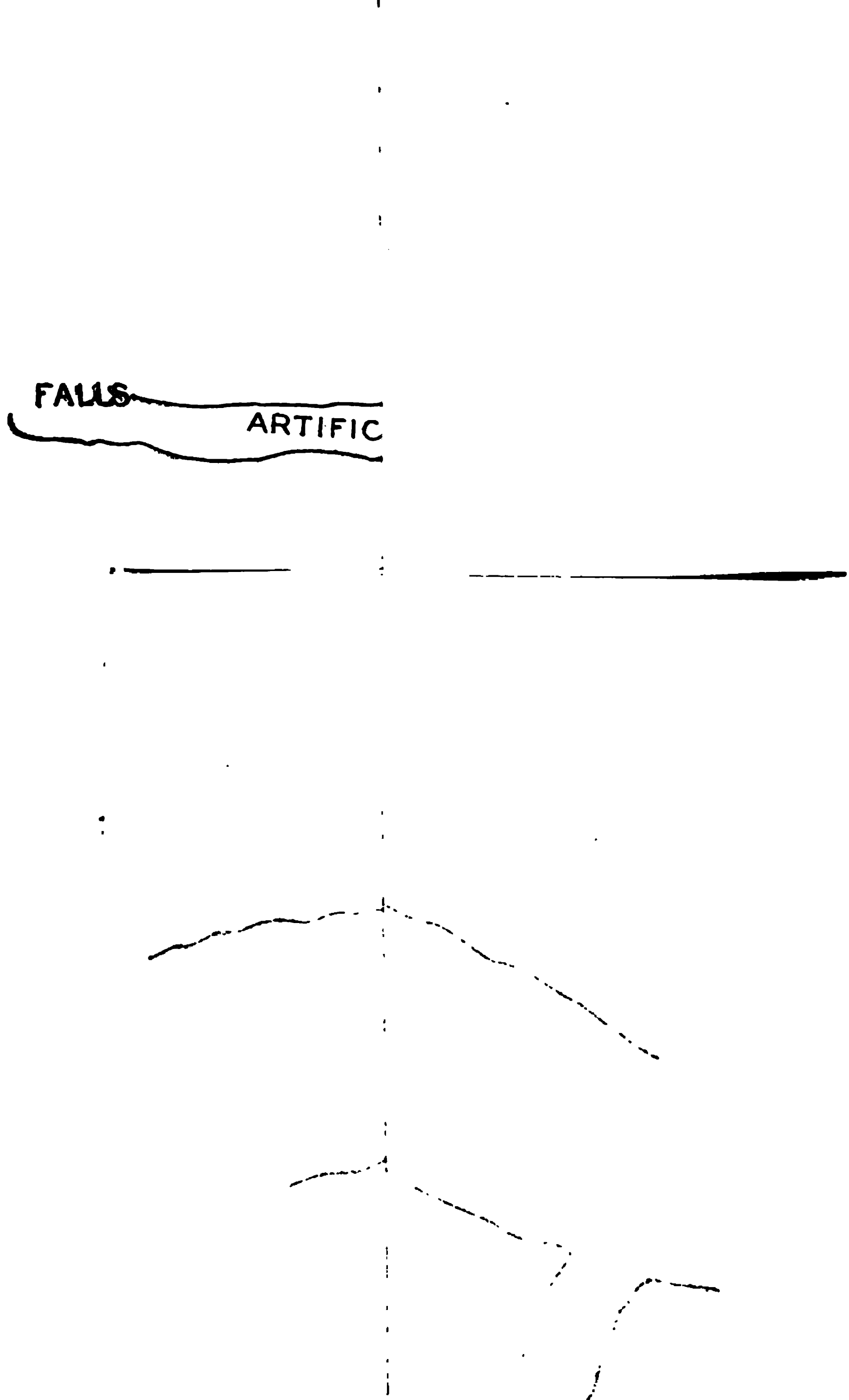
I reached there this morning and called at once on the local health officer, Dr. Lalor, who lives directly across the street from the Cronk & Carrier works. He introduced me to Mr. Cronk and to Mr. Shepard, the proprietor of the Pneumatic Tool Company's plant, immediately adjacent. These two gentlemen took

me over the ground and showed me the condition of affairs very thoroughly. The are both heartily in favor of the abatement of the nuisance and have evidently put considerable thought into the study of how it can best be done.

The situation is this: these two manufacturing plants, employing about 125 men, have practically no sewer facilities. The Cronk & Carrier works have been using a series of cesspools for excreta and wash water from their plant, and finding them unsatisfactory, they have combined with the Pneumatic Tool Company, and constructed a sewer which ends in a piece of swampy ground about 100 feet west of the Tool Company's plant, and immediately adjoining the back yards of two dwellings. At the time of its construction there was grade enough to permit of surface drainage from this point to the creek which carries the overflow water from Montour Falls. This creek follows an artificial channel made by State engineers and has been carefully dyked by earthen and wooden banks. These have given way in some places and the channel has so filled up with gravel that a back-water results, causing the marsh land before referred to. As a consequence, about two acres of land just west of the manufacturing plants and south of the Northern Central railroad tracks is marshland soaked with a mixture of backwater from the creek and excrement from the sewer.

Three possible remedies suggested themselves to me, and these I will endeavor to explain with the aid of a crude map. There is a State-built sewer, eighteen inch, running from the center of the village west in the filled-in prism of the old canal about one hundred feet north of, and parallel to the Northern Central R. R. track. It has a length of about half a mile and terminates in the canal, which continues on toward Seneca lake. This sewer carries waste water, etc., from the village, and is their only system of sewerage except the outhouses and cesspools. If permission were given to the Cronk & Carrier works and the Pneumatic Tool Co., they would gladly connect with this sewer and thus solve their problem.

The second remedy would be to run a sewer under the roadbed to the Northern Central due north to the large creek which runs through the village and empties into Seneca lake about four miles above. This creek the village authorities are now



conditions relative to the alleged public nuisance existing there.

. miles above. This creek the village authorities are now

dredging and dyking. The proposed sewer would have its outlet some distance below the last house in the village and so would not prove a nuisance. Its construction would require permission from the State authorities to go across the right of way of the State-built sewer.

The third remedy would be to continue the present sewer pipe of the two plants to the small creek which carries the overflow from the Falls; but in order to give it the necessary gravity depression a deepening of the creek channel would be needed. This, by the way, could be done at comparatively slight expense at the present time, for the steam dredge and laborers engaged in doing the work on the large creek are now on the ground and by a little work could remove the gravel which has filled the channel of the small creek, and drain the above-mentioned two acres of marshland, which at present is a breeding place for mosquitoes, and a menace to the health of the community. The existence of this marsh is due to the defective drainage of the State-built channel of the small creek, and the village authorities feel that the State should remedy this trouble inasmuch as it is responsible for it.

The manufacturing plants and the village trustees show a willing spirit to do all in their power to assist, and I am of the opinion that permission to connect the private sewer with the State-owned pipe, and to secure the dredging of the small creek bed for about one hundred yards is about all that they ask, or that the situation requires to abate what is now a grave menace to the public health.

Trusting that I am successful in making myself clear on these points and awaiting your further commands, I remain

Very respectfully yours,

EDWARD H. HUTTON

ALBANY, N. Y., *July* 30, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.*

DEAR SIR:— In accordance with your instructions, I visited on July 28th, the village of Montour Falls and inspected the conditions relative to the alleged public nuisance existing there.

I found the report of Dr. Hutton, under date of June 22, to describe the existing evils and possible remedies in as perfect a manner as possible and I so advised the health officer, Dr. Lalor. The superintendents of the two offending factories promised to extend their sewer at once and the Health Officer expressed himself as satisfied with their promises.

At the same time, it should be pointed out that the water into which such sewage will discharge, reaches, after a sluggish flow of about three miles the south end of Seneca Lake, which is used at the same end by the village of Watkins as a source of water supply. Willard Insane Asylum also uses the water at a point about half way down, and the city of Geneva also uses lake water taken from the north end of the lake. None of these places purify their sewage which discharges into the lake, and before long the question of preserving the purity of the lake as a whole should be taken up, but until the larger offenders are restrained, I recommend that no objection be offered to the proposed method of doing away with the existing nuisance at Montour Falls.

Very respectfully yours,

H. N. OGDEN

NORTHPORT

NORTHPORT, N. Y., *November* 21, 1906.

Dr. EUGENE H. PORTER, *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— At a meeting of the Board of Health of the village of Northport, N. Y., held on the 20th inst., it was decided to be necessary to introduce a system of sewage disposal for this village, as there is some question as to the feasibility of emptying sewage into Northport harbor. We respectfully request that you send if possible an expert from your office to consult with our Health Officer in relation to the matter. The Board would esteem it a favor if you would grant its request and have the matter attended to, at its earliest possible convenience.

Respectfully yours,

H. HENSCHEL,

Secretary

ALBANY, N. Y., *December* 3, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following memoranda in regard to Northport, L. I.

Letter received from H. Henschel, dated November 21st, 1906, stating that the village was considering the question of sewerage and requesting advice of this Department. Met Mr. Henschel, John P. Heyen, Health Officer, the board of village trustees and others, looked over the ground and discussed the situation with them.

The population of village is about 2,000. Many small private sewers discharge along the water front and one large one (250 houses connected with it) near Main street.

The village is evidently in need of comprehensive sewerage and owing to small drainage area tributary to harbor, and the location of the village near the upper end, the question of sewage disposal is important if not absolutely necessary.

The village is not heavily bonded, but I was not informed as to how much. Mr. Henschel thought village amply able to pay for sewage improvements if the people wished them.

The question of cost seems to be important consideration to them and they desire to construct only a sewer on Main street, which is to be paved soon, and to discharge it into the harbor at the foot of Main street below low tide.

The topography is such as to collect sewage easily from most of the village at the lower end of Main street, but not easy to lead it to remote places for either direct discharge or disposal plant without pumping.

I explained that ultimately, if not immediately, some method of sewage disposal would be required, and that it would be more economical to have comprehensive plans prepared for sewerage of the entire village, including means for disposal. I recommended that the proper course for them to pursue was to engage a competent engineer to design a complete system, including means for disposal, should this be required at once or in the future, and to adopt and submit these plans to this Department as soon as completed, and that if they insisted on securing a decision of

the Commissioner in regard to discharging the Main street sewer into the harbor without purification, to submit such a request at the time when complete plans, as above outlined, have been completed and presented for approval, for without such complete plans it is impracticable to fully consider such a temporary expedient.

The matter was left, that if additional information was needed, they would apply to this Department for it.

Respectfully yours,

THEODORE HORTON,
Consulting Engineer

OLEAN

ALBANY, N. Y., *December* 10, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In regard to the protest of the local health board of the city of Olean, Allegany county, that the city is about to construct a certain sewer in South Union street and that, in their opinion, this sewer would endanger the purity of the wells of the city's water supply located nearby, I beg to report as follows:

Olean was visited by one of our assistant engineers on November 30, 1906, and the conditions with reference to the sewer and wells were carefully inspected.

The water supply of the city is derived from about fifty driven wells, which are located in a plot of ground bordering the Allegany river, bounded on the east by the west line of South Union street. The pumping plant connecting these wells is located on South Union street south of the river and pumps the water to a distributing reservoir situated on one of the hills south of the city. Fifteen of these driven wells are 5 feet 6 inches distant from the west line of South Union street and have an average depth of 28 feet. Fifteen others are 17 feet distant from the street and have an average depth of 26 feet 6 inches. One well with 6-inch pipe, located 3 feet west of the street line, has a depth of 73 feet. It is proposed to locate the sewer about 26 feet east of the South Union street line.

Mr. J. Z. Le Fever, Superintendent of the waterworks, has furnished the following record of borings at time of driving wells:

From ground surface to a depth of from 15 feet to 18 feet, loam and sand; from 18 feet to 35 feet, gravel and hardpan; from 35 feet to 44 feet, light clay; from 44 feet to 50 feet, quicksand; from 68 feet to 75 feet, coarse gravel. The water supply serves some 6,000 to 7,000 population, and the per capita rate is approximately 147 gallons per day.

Objection was raised by the board of health against the construction of a sewer so near the wells. Dr. Cassar Smith, President of the Common Souncil, and City Engineer Allen, were both of the opinion that South Union street would be graded next spring from Green street to the river bridge, for the Western New York and Pennsylvania Traction Company have recently elevated the street car tracks, and in doing this have filled in the easterly half of South Union street between Green street and the river bridge. This work will probably necessitate the grading of the remaining half of the street.

Engineer Allen stated that his plan for this sewer, which was to serve the houses on this portion of South Union street, was originally to lead it north to the ten-inch sewer on Green street. The houses on this portion of the street are, however, located on the west side of the street and the street, not being filled in, would not give a covering for the lateral house connections. Therefore, this plan was changed and a new route adopted with an outlet leading direct to the river through Union street.

If then the sewer proposed on South Union street be led north to the Green street sewer, instead of south near the line of wells to the river, the possibility of contaminating the water supply will be avoided. Another end will also be served in that no new outlet for sewage discharge into the river will be created, and a greater concentration of the city's sewage will thereby result.

No report and map of the existing sewer system have been filed with the Department by the city in accordance with the provisions of chapter 468, Laws of 1903. Nor have any plans or application for the proposed sewer now in question been filed.

I should, therefore, recommend:

(a) That the city be notified to file a plan of their sewerage

system in accordance with the Act of 1903, and that application be duly made, in accordance with the same act, for the approval of plans for the proposed sewer in South Union street.

(b) That in order to protect the present driven well supply, the proposed sewer in South Union street be laid running north to Green street instead of south to the river, where it would run near the driven wells, and in case the ground water were lowered below the grade of the sewer any leakage from the sewer might directly contaminate the wells.

Very respectfully,

THEODORE HORTON,

Consulting Engineer

OLEAN, N. Y., *November* 21, 1906.

Commissioner of Health, Care State Board of Health, Albany, N. Y.:

DEAR SIR:— Hereto attached is a protest presented to the common council of the city of Olean from the board of health of this city. This protest is the outcome of the determination upon the part of the city to construct a sewer in South Union street, from a point below Green street to the Allegany river. The contract was awarded October 26th, and the protest received November 2d. The residents of that portion of the city duly petitioned the council to have the sewer constructed.

The common council is not satisfied with the outcome of the matter and desires to obtain the best information possible as to the probable seepage from the pipes and also the danger to the water supply, and I am directed by the president of the common council to communicate with you regarding the matter. The location of the wells is described in the petition hereto attached and it is the desire of the council that you render a decision, and if need be, make an investigation of the conditions as they actually exist.

Yours very truly,

JOHN F. ANDREWS,

City Clerk

To the Mayor and Common Council of the City of Olean:

GENTLEMEN:— The attention of the board of health of the city of Olean has been called to the fact that the city proposes to construct and maintain an eight-inch vitrified pipe sewer in and along the westerly side of South Union street, between Green street and the Allegany river, and that bids for the construction of such sewer were awarded at a meeting of the common council held on the 26th instant.

We, therefore, desire to call your attention to the fact that the wells from which the city is deriving its water supply are located in the immediate vicinity of said proposed sewer as follows: Fifteen 2-inch wells running parallel with Union street and distant less than 6 feet from the west line thereof having an average depth of about 28 feet; 15 2-inch wells running parallel with Union street and distant less than 17 feet from the west line thereof having an average depth of 26 feet 6 inches; one 6-inch well 3 feet from the west line of Union street having a depth of 73 feet. That the character of the soil in the vicinity of said wells and said proposed sewer, for a distance of from 15 to 18 feet below the surface of the ground, is loam and sand, and that any sewage escaping from such sewers will easily percolate and seep through the soil and into said wells. That it is a matter of common experience and knowledge that all vitrified pipe sewers will and do leak at the joints and permit the escape of sewage to a great or lesser extent at all times.

We desire further to call your attention to the fact that if at any time in the future it shall become necessary to obtain the city water supply, or any part of it, from the Allegany river, ás in times of drought, the proposed sewer will discharge itself into the river at a point directly opposite and across the river from the point where such water must necessarily be taken. It is the judgment and opinion of our board that the construction and maintenance of such sewer as proposed will render the water in said wells, which are being used to supply the inhabitants of the city with water, impure, unwholesome and deleterious to health, and is likely to endanger the health of the citizens of this city.

We, therefore, earnestly protest against the construction of

said sewer as proposed, and urge that you take such action as will prevent a perpetual menace to the purity of the city water supply.

Respectfully submitted,

Board of Health

By FRANK L. BARTLETT,

President

T. B. LOUGHLEN,

Secretary

PHILADELPHIA

PHILADELPHIA, N. Y., *May* 20, 1906.

State Department of Health, Albany:

DEAR SIR:— At a meeting of our local board of health last evening, May 19th, it was decided to notify you of the condition of an open sewer along the railroad track, in rear of houses on Main street, where all the children of the town have to walk by on their way to and from school. I will draw a diagram, as nearly correct as possible, houses 1, 2, 3, 4, 5, 6. Cellar drains run in open sewer; when the railroad was put through it cut their drains, so they say, and spoiled their outlet, and the tile sewer from Church street to the river is not down deep enough to drain their cellars. This has been a problem for five or six years, the health officer goes there and forbids them using sewers, then they throw their slops and washwater in the road, and that is worse still. What can we do and who do it? To that tile sewer from Church street to the river is a corporation sewer. Please send me book of by-laws governing local boards of health.

H. G. BROWN,

Secretary

AMSTERDAM, N. Y., *July* 31, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In reference to my inspection of July 11, made at your suggestion, of certain unsanitary conditions alleged to

exist in the village of Philadelphia, Jefferson county, I beg to report as follows:

As stated in the complaint received by the Department on May 20th, several houses on Main street discharge their sewage and waste water to the rear into an open ditch along the tracks of the R., W. & O. R. R.

Previous to the building of this railroad, this ditch water and sewage found its way across the present right of way of the railroad and into the Indian river. At present it lies in the ditch and seeps away, producing a long, narrow, stagnant pond.

The village authorities have been endeavoring to decide upon some plan to induce the railroad company to build a sewer, either at its own expense or in conjunction with the village, along the railroad to the Indian river. Of course, a railroad company, in equity, must provide culverts for the natural flow of surface water which has been disturbed by its operation, but a question arises as to whether or no the railroad company could be called upon to provide or help provide a sewer to supplant an improper and unsanitary method of disposing of sewage and waste water from dwellings.

It would seem that the proper procedure to provide a remedy for this and other like matters that may arise in the village is for the local board of health to take up the matter with the village trustees under authority of section 20 of the Public Health Law. Then a sewer commission could be established, a general plan of sewerage designed and adopted and relief could be afforded by the construction of such sewers as would be necessary, with the guarantee that such sewers as were constructed would form a part in the future of a comprehensive, economical system.

The village is incorporated, has a population of 1,000, a bonded debt of $30,000, and owns the water supply system and electric light plant.

The nearest village on the Indian river, below Philadelphia, is Theresa, twelve or fifteen miles distant.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

ALBANY, N. Y., *August* 10, 1906.

MR. H. G. BROWN, *Secretary, Board of Health, Philadelphia, N. Y.:*

DEAR SIR:— I enclose you herewith report of one of our sanitary engineers on his recent inspection of the conditions at Philadelphia.

You will note what he says about the proper procedure to be adopted, and I trust that your board will take such steps in the matter as appear to be proper.

I would advise that your board give this report its careful attention and also consult with its attorney.

Very respectfully,

EUGÈNE H. PORTER,

Commissioner of Health

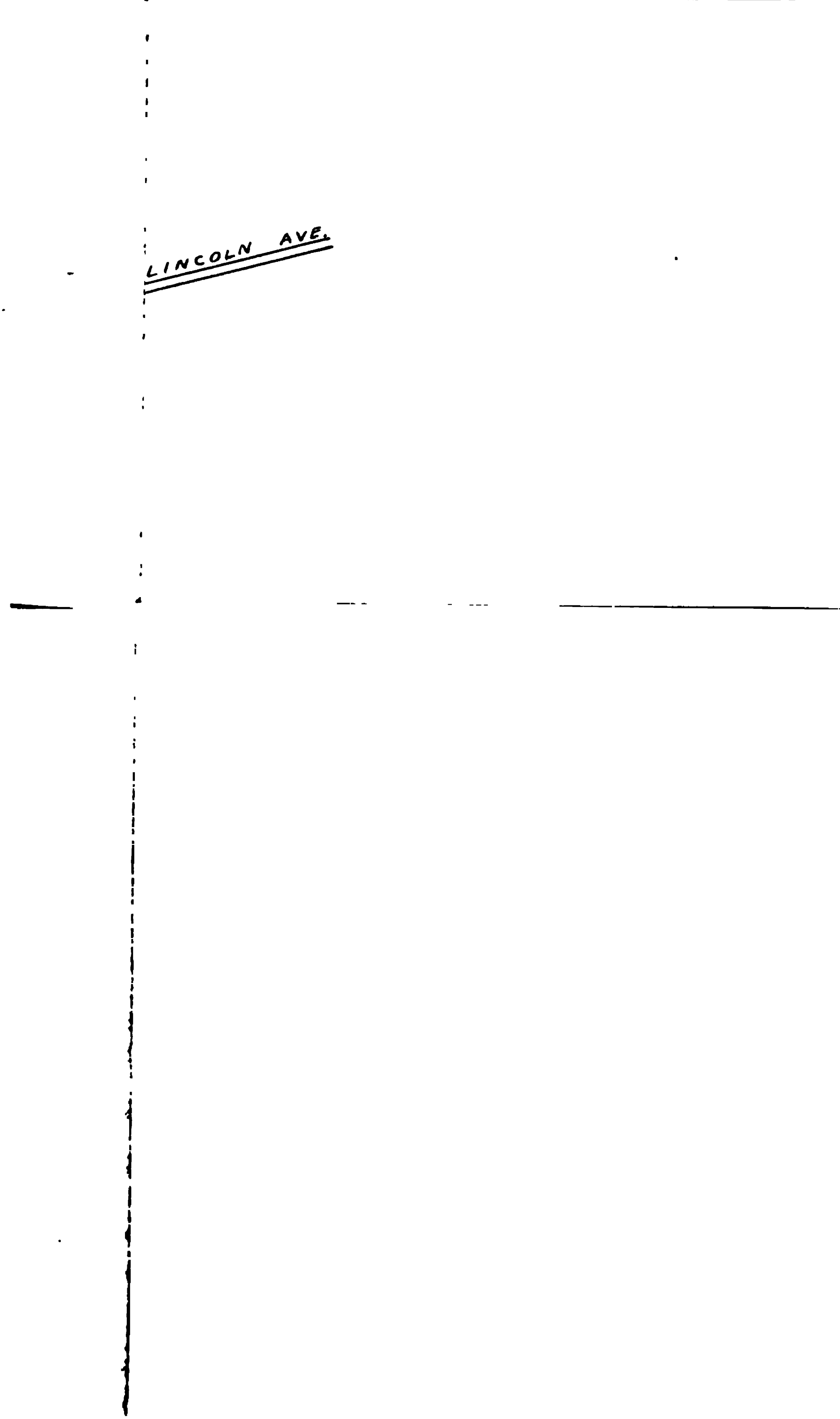
PORT CHESTER

PORT CHESTER, N. Y., *March* 1, 1906.

DR. E. H. PORTER, *Commissioner of Health, Albany, N. Y.:*

DEAR DOCTOR:— I present herewith the present status or affairs in the village of Port Chester, in regard to the matter of sewage and of the water and ice supply. This is in accordance with the request made by you when Mr. Brugler and I talked the matter over with you on the 22d of November, 1905, at your office in New York city.

The present sewage system covers a part of the village only. For this reason it is inadequate. It has three discharging outlets into the Byram river which forms a part of the eastern boundary of the village and near which is the area of densest population. For this reason it is unsanitary and against the general State laws. Permission for these outlets was granted by the State Health authorities some years ago, and you will doubtless find this on record. This was intended, however, to be a temporary arrangement and in my judgment should not be continued much longer. The river at most seasons carries only a small body of fresh water but is swept by the tide for a considerable distance further upstream than the sewer outlets. At low tide certain mud flats are left bare and by reason of their pollution by sewage exhale a stench


LINCOLN AVE.

ever, along Ridge street and its intersecting roads, lying just outside the village and within the township of Rye, would have no means of disposing of its sewage, and, as it is fairly well built up and continually growing, some means for looking to such disposal should be taken.

By starting the tunnel, therefore, at about the point indicated on the map, in the township of Rye, it would take care of the low lying section just outside of the village and offer a permanent means of disposing of the sewage there.

This would involve the joint action of the town of Rye and of the village of Port Chester. The tunnel would take the same general course in either event but in case the town joined with this village the tunnel would have to lie deeper, for the reason that the portion of the township of Rye lying just over the western boundary of this village is lower. The mouth of the tunnel would, therefore, begin at a lower level than if constructed entirely within the village limits.

This proposed joint action was talked over by the Boards of Health of the village of Port Chester and of the township of Rye and I am confident that your approval of this method would have the greatest weight in consummating a policy of economy for both communities.

The sewer undertaken by the village alone would have a length of 1,500 feet. By taking in the township at this part it would be only 900 feet longer. The additional expense would be defrayed by the town. Or, some impartial board could assess the amount which each community should contribute.

If the township of Rye does not join us it is absolutely helpless in the matter of providing sewers for that district. This village and the *village* of Rye shut it off from reaching the sound except for a course of several miles, along which pumping stations would have to be erected, as the fall is slight.

So convinced are we in this board that other than joint action would be folly that if I do not make all my statements clear I beg you will ask me further on this subject.

There seems to be an idea in some quarters that a legal difficulty may bar the union of the two communities in constructing this tunnel.

I have recommended to the board of trustees of this village that the above plans for perfecting the sewer system of this village be carried out. I beg you will give us your opinion on the desirability, the practicability and the legal status of the matter.

I enclose, beside the small map referred to, copies of reports submitted to the board of trustees by civil engineers made November 1, 1902, and December 23, 1903 and February 15, 1904; also a report made November 1, 1905 by me to the village trustees according to recommendations made by Engineer F. S. Odell to the local board of health. This report of mine does not suggest the union of this village with the town of Rye in constructing a tunnel, inasmuch as the idea had not then been thoroughly elaborated.

The Ice Question

In the summer of 1904 the local board of health visited several of the ponds from which ice was harvested near this village and found their condition so incredibly foul that an appeal was made to the State to send an inspector to take action in the matter. He visited the ponds in question and submitted a report condemning the ponds, a copy of which you will doubtless find on file at Albany.

This Board thereupon took up the task of preventing the sale of ice gathered from these ponds for domestic uses and printed notices in the local papers calling the attention of the people to the danger of using this ice in water or cooling drinks or for placing on food to preserve it. The ice dealers were permitted to sell the ice to butchers and tradesmen generally where it would be used for refrigerating purposes only and be kept from contact with food.

An experience of a year has shown the impracticability of any such half-way measure. The ice *was* used by many for cooling drinks in the various saloons and for domestic purposes. Of this there is abundant proof. Further the children of the poorer classes ate ice freely from the backs of these wagons in the summer. Some of this ice looked as filthy as if harvested over a manure pit. The ponds receive sewage freely, drainings from pig-styes, water-closets and so forth.

Realizing the inadequacy of its former edict the local board has given notice that it is its *intention* to prevent the sale of ice

from foul ponds for any purpose whatsoever the coming season. It has got to do that or let down the bars entirely.

The Water Supply

Mr. Brugler and I spoke with you about our water supply last November. We have had no analysis made, but, on investigating reports made to the Greenwich, (Ct.) board of health, that village deriving its water from the same source as our own, we found that the water was clear of bacterial pollution. At various seasons in the year, however, it is muddy and emits a foul odor and certainly is not fit to drink for the pleasure of drinking.

Now the question is how much dirt and how much stench, even if there are no bacilli present, have we got to stand before we can officially condemn the water.

If an inspector could be sent here by your Department and take a sample for analysis it would facilitate the closing of this question.

I am yours respectfully,

B. J. SANDS, M.D.,
Health Officer

AMSTERDAM, N. Y., *April* 7, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In accordance with your instructions I visited the village of Port Chester, Westchester county, on March 28th, for the purpose of examining local sewerage conditions, in response to a request from Health Officer B. J. Sands.

The matters under discussion are:

1. The need for a collecting trunk sewer to collect and treat all sewage at some point such as that near Fox Island road, shown on map accompanying Dr. Sand's communication of March 1, 1906.

2. The question as to the advisability of a move toward coöperation by the town of Rye and the village of Port Chester in the construction of the district trunk sewer through Sherman and Drew streets to Midland avenue and Beach street.

3. The menace to health from the use of ice harvested from polluted ponds.

4. The question of the purity of the water supply.

Referring to heading (1), it cannot be questioned that to eliminate the discharge of raw sewage into Byram river and Gun brook drain and, after treatment, to discharge it at ebb tide into Portchester harbor, would constitute a sanitary improvement of great importance, and I beg leave to recommend that the Department supplement the suggestions made by the village board of health to the board of trustees embodied in the report of Health Officer Sands, dated November 1, 1905.

The question as stated under paragraph (2) should be presented in the form of a comparison between the tunnel route through Sherman and Drew streets as an outlet for sewage from the township of Rye west of the village of Port Chester, and an alternate method of disposal at some future time, through means of an adequate sewage disposal plant to serve the district in question, and discharging its purified effluent into Blind brook. This latter alternative might not prove as satisfactory, either from a sanitary or from an economic standpoint, but is not impossible and before judgment could be passed on the relative merits of the two propositions, a close comparison should be made by the parties concerned.

In regard to the ice supply (3), if the local board of health is satisfied that polluted ice is being sold, and further, has realized by experience the inadequacy of half-way or partial measures to prevent its consumption in a way dangerous to health, then its duty is clear and imperative.

As to purity of water supply (4), I would suggest that at such time as Dr. Sands shall suggest, and when an analysis of water would be typical of the supply, the Department shall furnish the health officer with demijohns for forwarding samples of water for analysis.

I enclose herewith the communication of Dr. B. J. Sands to the Department, dated March 1, 1906, together with the map and the several reports listed in his communication.

Respectfully submitted,

H. B. CLEVELAND,

Inspecting Engineer

ALBANY, N. Y., *April* 25, 1906.

B. J. SANDS, *Health Officer, Port Chester, N. Y.*

DEAR SIR:— I enclose you herewith copy of report of one of the engineers of this Department on his examination of certain conditions in the village of Port Chester.

Your attention is called to the points which the engineer makes in this report, and after giving it your consideration I shall be pleased to hear from you further regarding the matter.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

RAVENA

ALBANY, N. Y., *November* 9, 1906.

MR. THEODORE HORTON, *Consulting Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR:— Complaint has been made to this Department by the health officer of Coeymans regarding an open ditch in his jurisdiction which carries sewage from Ravena.

The health officer is anxious to find out what can be done to improve the sanitary conditions and I wish you would have someone visit this locality and see what the conditions are and what can be done to remedy them.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *November* 16, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In regard to the complaint which has been received from Dr. Reid, health officer of the town of Coeymans, of the pollution by the village of Ravena, of the small stream that traverses the village of Coeymans, I beg to report that the locality was visited, and an inspection made of the conditions of pollution, and the extent of the nuisance complained of.

Coeymans is a small unincorporated village, having a population of about 1,200, located on the west bank of the Hudson river in the southern portion of Albany county. The village of Ravena, also unincorporated, lies just west of Coeymans and has a population of some 1,700.

Both villages are provided with water supplies but no sewerage systems. There is a small stream which rises in the village of Ravena and flows through the village of Coeymans to the Hudson river. In the village of Ravena some 500 people discharge sewage into this small stream, either directly or through small drains and owing to the small area tributary to the stream the summer flow is composed principally of sewage. The odors from the sewage discharged into the stream is the cause of the nuisance complained of.

In view of the nuisance caused by the discharge of the sewage into this small stream that passes through the village of Coeymans and the large number of people who contribute to this volume of sewage, it is evident that there is great need for the construction of a sewer to carry the sewage from Ravena to the Hudson river, or one of its tributaries. Although such a sewer could be constructed so as to avoid passing through the village of Coeymans, the topographic features are such that the most practicable and economical plan for a sewer would be to follow the line of the present ditch to the Hudson river. It is also evident that since the village of Coeymans pollutes in a large measure this same stream, it would also be benefited by the construction of a sewer to the Hudson river.

It would seem, in view of these facts, that the most practicable relief that could be afforded both villages would be a joint sewer outfall along the line of the present ditch which is now a public nuisance. Since both villages are unincorporated it would be possible at the present time for them to form a sewerage district under the village law and construct this outfall sewer from the village of Ravena to the Hudson river.

I would therefore recommend that a sewer be constructed from the village of Ravena to the Hudson river to carry the sewage that is now discharged into the open ditch leading through the village of Coeymans and would suggest that for this purpose

the unincorporated villages of Ravena and Coeymans unite to form a joint sewerage district provided for under chapter 348, Laws of 1901.

I would further suggest that since the villages of Ravena and Coeymans may have a rapid growth in the future it would be well for both villages to have prepared a comprehensive plan for sewers which would form a basis for future growth and development and that such plans be prepared in the near future and be submitted to this Department for approval.

Very respectively,

THEODORE HORTON,
Consulting Engineer

ALBANY, N. Y., *December* 11, 1906.

M. S. REID, M.D., *Health Officer, Coeymans, N. Y.:*

DEAR SIR:— I enclose you herewith copy of the report of our consulting engineer on his examination of the pollution by the village of Ravena, of the stream that runs through the town of Coeymans.

I would call your attention to the provisions of the report, and suggest that you lay the same before your local board of health and before the town board, and see if it is possible to take some action, as suggested by him, with reference to forming a sewer district under the provisions of chapter 348 of the Laws of 1901.

I will be glad to hear from you further about this matter, after it has received your consideration, and will also be glad to give you any advice or assistance in my power.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

SALAMANCA

SALAMANCA, N. Y., *August* 8, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— About a month ago, I asked by order of the local board of health, that a sewer expert, be sent here to look into the

village sewer question. I received a reply that the consulting engineer would come here in a few days. He has not arrived as yet.

At a meeting of the village board of health, held August 7, 1906, I was directed to ask the State Department, when the engineer was coming, and to ask that he come as soon as possible, as in their opinion the situation here requires immediate attention.

Will you kindly advise me when to expect him, and if it is, at all possible, direct him to come here at once.

Respectfully,

THOMAS E. SPALDING,

Health Officer

ALBANY, N. Y., *August* 10, 1906.

THOMAS E. SPALDING, M.D., *Health Officer, Salamanca, N. Y.:*

DEAR SIR:— Replying to your letter of August 8th regarding the Department sending one of its engineers to Salamanca: this matter was placed at once in the hands of one of our assistant engineers and he was instructed to visit Salamanca at his earliest opportunity.

Owing to the large amount of work in his hands, he has been unable to get to Salamanca but is at present on a trip in that part of the State and will be there in a few days.

Very respectfully,

EUGENE H. PORTER.

Commissioner of Health

AMSTERDAM, N. Y., *August* 17, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:—At your request I visited the village of Salamanca, Cattaraugus county, on August 14th, to investigate an alleged nuisance said to be caused by inefficient sewerage.

The complaint seems to be well founded. At the corner of William and Water streets, near the residence of William Hevenor, a sewer discharges into a stagnant cove of the Allegany river, creating extremely unsanitary conditions. Also, on the south side of the river, several sewers discharge into an abandoned race-

way or unused channel of the river which has recently been deprived of flow.

A combined sewer crosses this channel and, in times of excessive storm water flow, sewage is discharged through an overflow into the above-mentioned unused channel.

Immediate action should be taken to remedy the unsanitary conditions now existing. I would recommend that you suggest to the village authorities that a complete system of sewers be planned for the entire village and that the plan allow for the concentration of sewage at one or two points west of the village so as to permit its purification when the necessity shall arise. It would be entirely feasible, before this plan were completed, to design a low level sewer along the raceway which would eventually serve as an outlet for the low lying portion of the village south of the river and near the easterly boundary. The immediate construction of a portion of this outlet would eliminate present unsanitary conditions. Similarly, a sewer could be built, in accordance with the general plan, along Water street to the westward, taking care of sewage which now creates a nuisance at that point.

I would not recommend the approval of any sewer not planned and built in conformity to a general, comprehensive system.

The population of the village is about 5,400, approximately 3,000 residing on the south side.

The village has a complete water supply system. E. W. Terry is president of the village.

Respectfully submitted,

H. B. CLEVELAND,
Assistant Sanitary Engineer

ALBANY, N. Y., *August* 22, 1906.

MR. R. O. BEDELL, *President, Board of Health, Salamanca, N. Y.*:

DEAR SIR:— I enclose herewith report of our engineer on the sewerage conditions in Salamanca, and would recommend that this matter be taken up with the village authorities and such action taken as recommended in the attached report.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

SOUTH GLENS FALLS

SOUTH GLENS FALLS, N. Y., *October* 27, 1906.

State Board of Health, Albany, N. Y.:

GENTLEMEN:— The board of education of South Glens Falls Union School are building a new schoolhouse. We have the right of way to run an eight-inch sewer across Morgan Co.'s land to the river, which seems to be the only way available to sewer the building. Is there any law to prevent our running our pipe to the river? We do not want to go to the expense of laying this pipe and then be prevented from using it.

Yours truly,

H. B. PARKS,

President of Board of Education

ALBANY, N. Y., *October* 29, 1906.

MR. H. B. PARKS, *President, Board of Education, South Glens Falls, N. Y.:*

DEAR SIR:— Replying to your communication of October 22d, I would say that the Public Health Law of this State absolutely forbids the discharge of any sewage into any of the waters of this State except by permission of the Commissioner of Health.

If you desire to make an application for permission to run a sewer into the stream there, it will be necessary for you to file a written application from your board, in the form of a letter, together with a map or plans showing the size and grade of the sewer, where it will discharge, and also furnish us with information relative to the number of people who will sewer into the stream; and the matter will receive our attention at once.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

ALBANY, N. Y., *December* 4, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In the matter of an application from the board of education of the village of South Glens Falls, supplemented

by approval of the board of health, for the construction of an eight-inch sewer leading from Union Free School building on Fifth street and discharging into the Hudson river, I beg to report as follows:

The plan submitted has been carefully looked over and the locality has been visited by one of our assistant engineers for the purpose of making a careful inspection of the conditions relating to the proposed sewer and to the proposed point of discharge into the Hudson river.

It appears that the village has no regular system of sewers and that the proposed sewer is for the purpose of serving the union free school building without consideration as to whether it can be properly incorporated into a system of sewers for the village, which must eventually be built. The length of the sewer, some 1,500 feet, is relatively quite long for serving only one building and will, therefore, be relatively quite expensive as compared with the benefits to be derived.

In regard to the engineering features of the design, as shown upon the plan, the grades are satisfactory to give sufficient capacity and self cleaning velocities. No manholes or lamp holes are shown, however, and without them there may be considerable difficulty of either changing or locating any obstruction that may occur.

In regard to the propriety of discharging the sewage from the proposed sewer into the Hudson river without purification, it appears that there are no cities, nor to my knowledge villages, on the Hudson river within 100 miles below South Glens Falls, that use regularly the raw water of the Hudson river for water supply purposes.

Again the small amount of pollution added by the construction of this sewer, when compared with the volume of flow of the Hudson river at this point, could hardly produce a nuisance in the river. Since the Hudson river has and does receive more pollution than should be permitted and since only recently complaints have come to our attention in regard to this pollution (see letter of Mr. F. O. Filley regarding the pollution of the Hudson and Hoosic rivers) it is important that further pollution of the river be curtailed.

In view of this fact, that the village of South Glens Falls has no general system of sewers, and that the present sewers have not been designed to meet the possibility of being incorporated into such general system and that no system of purification of the sewage has been included in the plans presented, I beg to recommend that:

1. The original application be first approved officially or be presented independently by the trustees of the village of South Glens Falls before any permit be granted by this Department.

2. That after such approval by the village authorities is secured, a permit be granted the Board of Education, in accordance with their petition, approved by the board of health and village trustees, to discharge the sewage from Union Free school on Fifth street in the village of South Glens Falls into the Hudson river for a period of one year, upon condition that the village trustees have prepared and submit to this Department for approval during this time, a comprehensive plan of sewerage for the village, which shall include also a provision for the sewerage of this school.

Respectfully yours,

THEODORE HORTON,
Consulting Engineer

WHITE PLAINS

SCHENECTADY, N. Y., *March* 12, 1906.

Dr. E. H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In the matter of a complaint recently received by the Department from Dr. J. H. Gunning, health officer of the town of Scarsdale, Westchester county, alleging a pollution of the Bronx river by the sewage from White Plains, which matter was verbally referred to me at your direction, by Mr. Seymour, a few days ago, I beg to state that on the 7th instant I directed Mr. King to investigate the alleged pollution and report on the same.

The written communication from Dr. Gunning has not been submitted to me, nor was it sent Mr. King at Scarsdale, as arranged.

I beg to enclose you herewith a copy of Mr. King's report on his examination at Scarsdale and White Plains. It is quite evident that at this time of year, with the temperature frequently below freezing, it is out of the question to verify the conditions alleged to exist in Scarsdale and Hartsdale during the summer. From Mr. King's description of the sewage disposal plant of White Plains and the conditions there existing, there is no reason to doubt the validity of the complaints of summer conditions along the stream below the plant.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer

SCHENECTADY, N. Y., *March* 12, 1906.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health:*

DEAR SIR:— In accordance with instructions received from you by letter of March 7th, I visited on March 9th the village of Scarsdale, and was met by J. H. Gunning, M. D., health officer of the town of Scarsdale.

No communication was received by me from the Department there, so that my investigation was based upon the complaint as described by Dr. Gunning, namely; that the Bronx river throughout its course in the town of Scarsdale, because of alleged pollution from the sewage of White Plains, is, especially in summer, a menace to the villages of Hartsdale and Scarsdale in that town, often becoming so foul and offensive as to drive residents of the neighborhood indoors; and often being itself of a creamy color. Further evidence and the results of investigation are given in the following report.

Dr. Gunning, upon my arrival in Scarsdale, conducted me to the Bronx river which flows close to the railroad from White Plains to below this point. The river, at the time of my inspection was high, the water somewhat turbid, non-odorous and of a wholesome color. Here, Dr. Gunning claimed, when the stream is low in hot weather, the smell is unbearable, passengers waiting

for trains are driven inside the station, etc. He further said that the stream became so nearly dry in summer that the rise of the stream at each discharge from the sewage disposal plant at White Plains was very marked; and that upon subsiding, a slimy white coating was left upon the mud, giving rise to the constant bad odor. The odor is worst while the effluent is passing.

From this point we followed the stream as nearly as practicable to Hartsdale, about two miles upstream from Scarsdale. At no point was there any offensive odor, or visible signs of pollution. The bed of the stream is for the most part a soft, spongy, black mud, with scattered boulders of considerable size.

At Hartsdale, where there is quite a settlement close to the railroad and stream, the conditions were much the same, except that several clods were carried past as we watched,— clods resembling partly decomposed faeces. At this point a sample was taken for bacterial analysis. Hartsdale is the point from which most of the complaints to Dr. Gunning have come. Dr. Gunning at this point was forced to return to his office in New York. I continued up the stream about a mile to the sewage plant. In this mile there are no dwellings in the vicinity of the stream.

The Sewage Disposal Plant of White Plains

Just within the town of White Plains close to the northern extremity of the town of Scarsdale, to the west of the railroad, is the plant for the chemical treatment of White Plains sewage. Mr. Shay, the day operator of the plant, conducted me through the plant and furnished general information regarding the sewage system. The sewage from White Plains and from Bloomingdale, amounting to from 700,000 to 900,000 gallons daily, is treated at this plant. No surface, street, or other drainage, other than house drainage, is supposed to be treated at the plant, but Mr. Shay claims that after heavy rains there is a marked increase in the flow of sewage, such as to tax the plant beyond its proper capacity.

The method employed in the plant is one of chemical precipitation, and the agents used are lime and a salt of iron upon the raw sewage; and vitriol, common salt and manganese in the treatment of the sludge. The iron referred to is secured in the form of a solution, very dark greenish-brown in color, readily attacking cloth

as a powerful acid or alkali. It resembled ferrous sulphate. Mr. Shay could not tell me what the salt was — it is furnished by the General Chemical Company of Passaic, N. J.

The raw sewage is simultaneously mixed with lime and the iron salt, and thoroughly agitated, thence passing through four sedimentation tanks, by syphonage, and finally passing out into an open drain as a supposedly clear effluent. About four pails of the iron solution are used daily, and from six to eight barrels of lime. The sludge from the precipitation tanks is pumped out once weekly — a process going on during my inspection.

At the time of my inspection, the iron solution was *not* being continually added to the raw sewage, as Mr. Shay declared was done; all other parts of the process were in continual operation.

The final settling basin, from which the effluent syphons off into the drainage ditch, contained at the time of inspection a far from clear liquid, and Mr. Shay said that the effluent was very rarely clear, and often toward the end of a discharge would be milky in appearance, and strong in odor. He said that the general health of the laborers in the plant was good, but that they were often troubled with a severe nausea, especially when the plant was most heavily taxed. There is no automatic device to secure a fixed ratio between the amount of sewage treated and the chemicals employed — neither is any great effort made to secure the same by hand regulation. The plant under normal conditions discharges its effluent about four times daily; three times during the day, and once at night. The sludge which had been removed one week previous was uniform in appearance, light brown in color and without any disagreeable odor.

Proceeding from the plant upstream to the town of White Plains, no difference was noticeable in the appearance of the stream. At the southern edge of the town, about twenty houses are supplied with privies situated on the very bank of the stream.

I endeavored to see Dr. Birch, the health officer of White Plains, and Mr. John T. Rehill, president of the sewer board, but was unable to see either.

Pollution to Bronx river must certainly occur, and be due in large part to the effluent from the sewage plant of White Plains. This effluent is certainly immature, disagreeable in appearance and

smell, and variable in its nature. There are no industries in White Plains which in any way affect the purity of the stream, and the few privies referred to are insufficient to produce a nuisance as described. The turbidity of the stream was only such as would be expected during a thaw such as existed.

Respectfully submitted,

ERIC T. KING,
Inspecting Engineer on Water Supply

WHITE PLAINS, N. Y., *April* 20, 1906.

HON. EUGENE H. PORTER, *State Health Commissioner, Albany, N. Y.:*

DEAR SIR:— I am advised by the president of our village that Hartsdale and Scarsdale have complained to the State Board of Health in regard to our sewage system. A similar complaint was made in the fall of 1904, a communication was sent to the president of the village of White Plains on December 28, 1904 from your Department. I enclose you herewith a copy of my letter to the then Health Commissioner. Subsequent to that Mr. James J. R. Croes, engineer, was appointed by your predecessor to make an examination of the works, he came here, started the examination, but did not complete it prior to his decease. I have been expecting some one to be appointed in Mr. Croes' place so that our authorities could consult him.

Yours very respectfully,

H. T. DYKMAN

ALBANY, N. Y., *April* 26, 1906

MR. H. T. DYKMAN, *White Plains, N. Y.:*

DEAR SIR:— I am in receipt of your letter of April 20th, with enclosures, in reply thereto I beg to say that one of the inspecting engineers of this Department made a careful examination of the disposal plant of White Plains on March 9th last, and in his report to the Department I asked him to suggest certain changes in the operation of the plant which would result in the production of a more satisfactory effluent, and do away with the constant complaints which are being received from the towns of Hartsdale and Scarsdale.

You are of course aware that the chemical treatment of sewage has not the highest endorsement of contemporary engineers even at its best. When in addition a plant is overtaxed it is almost impossible to obtain highly satisfactory results.

In the report of the inspecting engineer, after his examination of the plant he said in part as follows:

"No surface, street, or other drainage, other than house drainage, is supposed to be treated at the plant, but Mr. Shay claims that after heavy rains there is a marked increase in the flow of sewage, such as to tax the plant beyond its proper capacity.

"At the time of my inspection, the iron solution was *not* being continually added to the raw sewage, as Mr. Shay declared was done; all other parts of the process were in continual operation.

"The final settling basin, from which the effluent syphons off into the drainage ditch, contained at the time of inspection a far from clear liquid, and Mr. Shay said that the effluent was very rarely clear, and often toward the end of a discharge would be milky in appearance, and strong in odor.

"There is no automatic device to secure a fixed ratio between the amount of sewage treated and the chemicals employed — neither is any great effort made to secure the same by hand regulation."

If you can positively exclude all other than house drainage; if you can secure a proper regulation so as to establish a correct and fixed ratio between amounts of chemicals and of sewage; if you can secure faithful and intelligent operation — then you can secure a less harmful effluent. One thing especially should be striven for — to give all the time and room possible for the precipitation and subsidence. It is in this part of the treatment where the overtaxing of the plant is most keenly felt. If you built two more settling basins of greater capacity, you would, I am confident, secure gratifying results.

It would be well if you could retain an experienced man for a sufficient time to study and watch the peculiar defects of operation, and to instruct your foreman accordingly. If the plant could by such means be made to work out its best possible efficiency, it is possible that it might be made to serve until the completion of the Bronx valley sewer.

It seems to me important that some steps should be taken by the authorities to regulate the operation of this plant and remedy the conditions that have existed in the past. I would, therefore, urge that you give this question your consideration and advise me as to what steps you propose to pursue.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health.

In response to several requests a further inspection was made of the Bronx river, near White Plains and of the White Plains sewage disposal plant.

ALBANY, N. Y., *October* 24, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In accordance with directions from you to make an inspection of the sewage disposal plant at White Plains, Westchester county, with special reference to its operation and efficiency in purifying the sewage now treated at this plant and the effect of the discharge of the effluent into the Bronx river below White Plains, I beg to report as follows:

On October 17th, 1906, I visited the White Plains disposal plant, which is located in Hartsdale, very near the White Plains village line. Owing to the short time available for this visit I did not confer with officials in White Plains but went at once to the chemical precipitation works and looked over carefully the various features connected with the construction and operation of the plant, the quantity and appearance of the sewage as it is delivered at the works, and the appearance and character of the effluent. I observed also the methods employed in the removal of sludge and made inquiries as to the frequency of sludge removal, the amount of chemicals used, etc. I further walked along the banks of the Bronx river below the point of effluent discharge through a portion of the village of Hartsdale, and observed the effect of the discharge of the sewage effluent upon the condition of the stream and the extent of the alleged nuisance caused thereby.

Referring first to the pollution of the Bronx river, by the discharge of the effluent from the disposal plant, I found this to be considerable. The effluent showed only a relatively small amount of purification, as was evidenced by its strong odor and high turbidity as it discharged into the stream, and further from the decided odor from the stream itself, as far as I observed it for some one half mile distance below the outfall. I observed that wherever there was slack water in the stream there were accumulations of organic growths in a state of putrefaction, as evidenced by the escaping bubbles of gas. Again the shores of the stream and the stones in the stream were in many places covered with a film of organic matter of the nature of sewage sludge. In short there was unquestionably a nuisance created along the upper reach of the Bronx river on the day of my visit, due to the discharge of the partially purified sewage from the chemical purification plant into it, which nuisance, I am of the opinion, would be considerably greater during summer time when the flow in the stream is less and the air warmer.

The cause of the conditions just described will be readily understood when we consider the quantity of sewage treated at the plant in relation to features of construction and operation. On the day of my visit, I observed the depth of flow in the main sewer leading to the disposal plant and computed the flow to be at the rate of about 900,000 gallons for twenty-four hours. This corresponds to a probable average flow of say 750,000 gallons during the twenty-four hours.

From official reports and descriptions of this plant which are available it appears that these works were designed to treat less than half the daily flow of sewage as above observed. This is further evidenced by the fact that the period of sewage flow through the tanks as now operated is less than half the minimum time required, with modern practice, to effectively purify sewage of the composition of that from the village of White Plains.

Again there are defects in the arrangement of application of chemicals which still further seriously affect the required subsidence of the suspended matters. For instance, the chemical solutions do not get sufficiently or uniformly mixed with the sewage as it enters the first settling tanks so that the subsiding effect

of the chemicals is not secured until the sewage has passed for a considerable distance through the settling chambers. Also there is not effective enough stirring of the applied solutions to produce the required uniformity of applied chemicals to the sewage. Finally there is no effective means of varying the amount of applied chemicals to the varying flow of sewage during the day — especially since a portion of the sewage which is pumped at an auxillary pumping station is discharged into the sewerage system intermittently.

It was stated by the attendant at the plant that eight barrels of lime and one carboy of perchloride of iron were used daily at the plant. I was unable to verify this, but from the quality of the effluent have good reasons to doubt whether this amount is uniformly used or that more than a small proportion of the amount was being used on the day of my visit.

An estimate of the sludge removed from the tank, based upon measurements and observations, and from the information obtained from the attendant, shows that not more than about one-half ton of dry sludge is removed daily. This is less than half the amount that should be removed from the quantity and quality of sewage now receiving treatment at the plant and verifies roughly other estimates that the purification now effected is less than half what should be secured from a plant of this sort properly operated. Since chemical precipitation plants of this type, operating under favorable conditions, remove but little in excess of one-half the organic matter contained in the sewage, it is evident that the effective purification of the White Plains sewage can hardly be in excess of 25 per cent.

The question of most importance now, in view of the possibility of the construction of the Bronx Valley trunk sewer in the near future, is whether anything can be done with the disposal works in its present shape in order to increase the purification now effected either by temporary and relatively inexpensive modifications in the present construction of the works and their operation, or whether it will be necessary to make radical changes in both of them.

It appears that the sewage as it passes through the tanks is carried to a depth of not over three feet, whereas the depth of

the tanks are about ten feet. I consider it quite possible that a rearrangement of the interior walls and chambers could be effected at a reasonable cost by which it might be possible to increase the "period of flow" through the tanks to at least twice what it now is and allow the plant to be operated upon the "continuous flow" system instead of the "fill and draw" system now in use. This might necessitate pumping the sewage in order not to back-water the main outfall sewer, and it might even be possible to avoid this pumping, until the construction of the Bronx Valley sewer, by allowing the outfall sewer leading to the plant to operate under a head as in the case of an inverted siphon. In any event it will be very essential to modify the present devices for applying chemicals, or introduce new ones, by which a better mixing ~~of~~ chemicals and a better adjustment of the application of them to the varying sewage flow can be secured.

Again it might be possible to convert the present tanks into septic tanks, doing away entirely with chemicals, and in conjunction with this change to install supplementary rapid sewage filters of the contact or sprinkling type. This is entirely feasible and no doubt ample area adjacent to the plant is available for the construction of such filters.

I should, in consideration of the above facts and suggestions and after first making official inquiry as to what steps, if any, the village authorities have taken to better the condition of their sewage purification plant, recommend:

First. That in case no action has been taken in these respects, proper steps be taken by this Department to induce the village of White Plains to cause a study to be made to determine whether modification in the construction of chemical devices and the operation of their disposal plant can be made, as will give a sufficiently pure effluent to admit of its temporary discharge into Bronx river without creating a nuisance until the Bronx Valley joint sewer is constructed.

Second. That if, after careful study has been made by some recognized expert, it is found that a modification of the present condition of the plant and its operation cannot, with any degree of success, improve its efficiency, that more radical steps be taken by the village to convert the present chemical tanks into septic

tanks and introduce in conjunction with them rapid sewage filters as above described.

I feel assured that, if the village of White Plains will take up this question seriously on such lines as suggested above, they will be able, with comparatively small expense, to afford relief to the residents of the villages of Hartsdale and Scarsdale, from the offensive nuisance which they have endured for a considerable time as a result of the discharge into Bronx river of the insufficiently purified sewage from the White Plains Works.

Respectfully yours,

THEODORE HORTON,
Consulting Engineer

ALBANY, N. Y., *December* 8, 1906.

President of the Village, White Plains, N. Y.:

DEAR SIR:— Regarding the matter of the pollution of the Bronx river, a communication was sent to the president of the village on November 30th, but was misdirected to Dr. Schmid, who is the president of the board of health.

After a careful examination of the sanitary condition of this river and the operation of your sewage disposal plant by our Consulting Engineer, a copy of whose report I herewith enclose to you, I wish to urge upon you serious consideration of the matter of increasing the efficiency of your sewage disposal plant, thereby relieving the unsanitary conditions which now exist.

Your attention is called to the findings of our Consulting Engineer, particularly as to certain modifications which might be made in the arrangements of the tanks and the method of their operation. I urge that your village authorities at once consider the question of improving the conditions and operation of your chemical purification works in a manner that will relieve the nuisances to which the villages along the Bronx river below White Plains have been subjected for a long time.

Will you kindly take this matter up and give it your careful consideration and advise me about it at your earliest convenience.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

I(c). PLANS FOR SEWERAGE AND SEWAGE DISPOSAL FOR STATE INSTITUTIONS

Section 13a, article I of Public Health Law, specifically provides that the plans for sewerage and sewage disposal of State institutions shall be subject to the approval of the State Commissioner of Health before being adopted and constituted. The preparation of such plans is officially under the supervision of the State Architect, but since the work is strictly of an engineering nature and since the plans must finally be approved by the State Health Commissioner, by a mutual arrangement between the State Architect and the State Commissioner of Health, this important work has been taken up by this Bureau.

The first work of preparing plans for State institutions was undertaken during August, 1906, and since then considerable time and labor has been devoted to it.

In addition to to the three institutions for which plans have been completed, there are two institutions for which sewage disposal plans are in preparation, and still others the sanitary conditions of which will necessitate the preparation of plans in the near future.

Prior to August, 1906, plans for sewerage and sewage disposal of State institutions were submitted to the Department for approval in the same manner as those submitted by municipalities.

WESTERN HOUSE OF REFUGE AT ALBION

A sewage disposal plant for this institution was constructed in 1898 and has been in operation since that year. This plant was of a type involving improved filtration and aeration and has never, under existing management, been a success from a sanitary point of view. It has recently been the cause of considerable complaint, and plans are now being considered for modifying the construction in a manner that will remove the objectionable features that now attend its operation.

BINGHAMTON STATE HOSPITAL, BINGHAMTON

Plans for the modification of the sewerage system of this institution were submitted for approval by the State Architect, March

29, 1906. After examination of these plans, they were returned for corrections and further modifications. The plans were again submitted and finally approved July 18, 1906.

KINGS PARK STATE HOSPITAL

Plans for improved sewerage and sewage disposal of this institution have been under consideration for several years, but for many reasons no plans had been completed and approved prior to 1906. The matter was actively taken up by the Department in September, and the completed plans and report of consulting engineer turned over to the State Architect in December.

ALBANY, N. Y., *September* 18, 1906.

WILLIAM AUSTIN MACY, M.D., *Sup't Kings Park State Hospital, Kings Park, Long Island, N. Y.:*

DEAR SIR:— Replying to your communication of Sept. 17th, relative to the sewage disposal plant for the Kings Park State Hospital, our Consulting Engineer has taken this matter up with the State Architect and the State Architect is furnishing him with maps, etc., which he has on file there, which will be of much assistance to us in this matter.

This is an important matter and the subject is one which must receive careful study as to the methods of disposal involved before a plan can be decided upon.

I have instructed our Consulting Engineer, Mr. Theodore Horton, to give this matter his personal attention and assure you that I will do all in my power to facilitate the matter in every way. He will go over the matter thoroughly with the State Architect and will, I expect, call upon you within a very short time and go over the ground personally.

I can thus assure you that the matter will receive careful consideration and every effort will be made to proceed with the work as rapidly as possible.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *December* 10, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit herewith preliminary plans for a system of sewerage and purification works for the Long Island State Hospital, which have been prepared in accordance with your direction. Accompanying these plans are also submitted an estimate of cost, and the following report setting forth the essential features relating to a discussion of alternative methods of sewage collection and disposal and recommendations as to which of these methods is the most practicable and economical one to be adopted.

REPORT

The matter of sewerage, and especially sewage disposal for this institution, has been considered for a number of years, but more especially in 1900, when Mr. George W. Rafter made an extended study and report thereon. This report is on file in the Department and without reviewing it at length it may be stated that the author recommended a treatment of the sewage by broad irrigation, without a separation of the storm water from the domestic sewage, and under conditions requiring continuous pumping.

No construction was undertaken in accordance with the plans and little further study has been made of the matter until the present time. The plans now prepared are radically different from the one just outlined and have been made after a careful study of local conditions which exist at Kings Park and after frequent visits made by myself, supplemented by a limited amount of engineering field work.

The institution at Kings Park is now provided with an extensive system of sewers, all upon the combined plan. The sewers are collected in two main outfall sewers, both leading to the water front — a large six-foot sewer which discharges into Smithtown bay on Long Island sound at the northwesterly limit of the institution grounds, and the other a small eighteen-inch sewer which discharges into Nissequogue river near its entrance to Smithtown bay. The six-foot sewer receives the sewage of the

various buildings upon the grounds, roofwater and water from catch basins located along the roads. The smaller sewer receives wash water from the laundry, very little sanitary sewage, and some roof and street surface water. To collect and treat the sewage of the institution in the most effective and economical manner was the problem presented, and this involved the consideration of a number of factors.

The first of these refers to the question of separation of surface water from the sewage. Sewage disposal without such separation would mean that during times of rain the volume would be so great as to preclude a purification of all of it and most of it would have to be discharged into the bay without purification. Again, without separation, a considerable amount of ground water leakage would have to be treated at all times and this would considerably increase the size of the purification plant and the expense of operation. It was, therefore, deemed important to separate the sewage from the storm water by a complete and independent system of sanitary sewers, thereby securing purification at all times, a smaller volume to be treated and, as will be seen later, a system that will not require pumping.

The second factor was the selection of available sites for a disposal plant and the type of disposal plant best suited to such a site.

A plan was considered of utilizing the present six-foot sewer leading to the bay and locating treatment works at some point on the lower reaches of this sewer. The objections to such a proposition, which more than outweigh the points in its favor, are:

1. The relatively low grade of this sewer with respect to tidewater and the great depth of cut of this sewer would, from an engineering standpoint, make not only the cost of construction excessive, but would necessitate pumping and thereby increase considerably the cost of operation.

2. The fact, already stated, that considerable needless expense would be involved if the entire flow, including roof and surface storm water, were to be treated; or if this were avoided, the lack of any purification in times of any considerable storm water flow.

Comparisons of the economy and efficiency of a plant located on the line of this sewer with similar plants located on other sites and under more favorable conditions led to its abandonment.

Another plan considered was the location of purification works on the western end of Great Bar, a sandy peninsula near the mouth of the Nissequogue river, which presented unusually favorable conditions for natural sand filters. The sand was analyzed and proved of excellent size and quality, and the available area was found ample for the purposes. The two difficulties presented here, however, were the impracticability of securing this land, which is not a part of the institution grounds, and the engineering difficulty of constructing an inverted siphon across the tidal "gut" at this point, the expense of which would be considerable and uncertain. This site was, therefore, also excluded.

The other sites available for the location of purification plants were of a character most suited to artificial filtration, and more particularly to rapid filters of the so-called "contact" or "sprinkling" types, more effectively operated in conjunction with septic tanks. Only two of these sites presented features desirable enough to be considered. One site was at the junction of Dairy road and St. Johnsland road, which will be referred to as site "B," and the other near the Landing road, some 1,000 feet north of the low-storage reservoir, which will be referred to as site "A".

Before describing in detail the type of plant proposed in connection with these two sites, a brief description will be given of the systems of collecting sewers necessary to deliver sewage at these two points. On the general plan, system "A" is shown by full lines and system "B" by dash lines.

In system "A," the main sewer, as shown on the plan, starting at a manhole just west of the cottage group No. 1, runs in an irregular but northerly direction in the rear of buildings C and D to a manhole between cottages Nos. 3 and 4 of the men's group. At various points it will receive sewage from the buildings which it passes. From this manhole the sewer runs easterly to a manhole on the Boulevard, where it receives sewage from a branch sewer running north on the Boulevard which serves, in front, the

buildings A, B, C and D shown upon the plan. The sewer then runs easterly intercepting other branch sewers which serve the rear portions of the nurses' home, buildings A and B and cottages A, E and J of the women's group. The main sewer then continues down the Boulevard and the Laundry road to a manhole north of the Landing road near the easterly end of the reservoir, intercepting on its way laterals from the laundry, bakery, kitchen and stables.

A portion of this section of sewer, from a manhole near the boiler-house to the manhole north of the Landing road, will be constructed of ten-inch castiron pipe and will flow under a head when in operation. This was made necessary by the depression in the road along the easterly side of the reservoir. An emergency overflow into the existing laundry sewer is provided at the upper end of this castiron main. From the end of this castiron main the sewer runs easterly and northerly to disposal plant site "A".

In system "B," there are two main-branch sewers for the collection of the sewage. One branch starts at a manhole in the southwesterly section of cottage group No. 1, and leads to a manhole in the roadway west of cottages No. 3 and No. 4 of the men's group, as in system "B." At this point it receives the sewage collected by the sewer on the Boulevard in front of buildings A, B, C and D, in which the flow is in reverse direction from that in system "A." From the above manhole this sewer continues diagonally down the hill to disposal plant site "B."

The other branch in system "B" starts at the manhole in the rear of the nurses' home and runs in the rear of buildings A and B to a manhole in the Boulevard, as shown upon the plan. The sewer from this manhole continues north along the Boulevard to a manhole at the cross road from which the Laundry road starts and at which cross road it receives sewage from the lateral sewer running north from cottage E of the women's group. From this junction manhole the sewer runs westerly along this cross road about 550 feet to a manhole where the sewer from the Laundry and group of buildings near the cold storage building joins it. From this manhole the sewer follows the contours around the hill near the St. Johnsland road to disposal plant site "B," where it unites with the other branch of sewer system "B".

Works for the purification of the sewage thus collected and delivered at either site "A" or "B" will, with respect to general design and construction, be practically the same. The selection of either site will affect only the general arrangement upon the ground and the adjustment of the different structures to the topography of the respective sites. The plants in either case will consist of a grit and screen chamber, septic tanks and sprinkling filters, all designed with a capacity for treating a volume of sewage contributed by 5,000 persons at an average rate of 100 gallons per day per person. Both the septic tank and sprinkling filters are so planned as to admit of future extension without any sacrifice of the proposed construction.

On reaching the disposal plant the sewage will first pass through a grit chamber provided with a screen made of iron bars spaced one inch, center to center, where the coarser suspended matters are deposited, and where the paper, rags and other matters are retained upon the screen. The grit chamber is in two sections, either of which, by means of sluice boards at inlet and outlet, may be operated independently of the other, and thus facilitate cleaning.

From the grit chamber the sewage will pass to the septic tanks. It will enter first a distributing channel extending across the head of the septic tank, from which, by means of pipe inlets operated by flap valves with chains, the sewage is evenly distributed to the three chambers of the septic tank at a depth of three feet below the surface. A baffle board at the foot of the septic tank is so arranged that the effluent from the tank will be drawn off at a depth of three feet below the upper level.

The effluent from the septic tanks is collected in another cross channel, and by means of sluice gates is led into two distributing chambers separated by a division wall. An automatic siphon will discharge the effluent from either or both distributing chambers through a system of distributors onto the sprinkling filters.

The sprinkling filters have an area of approximately .25 acres, divided into eight beds or units. These beds will be composed of screened coke, seven feet in depth, of sizes ranging from one inch to two inches in diameter. The walls and floor of these filters will be constructed of concrete. The floor will be paved with six-inch

inverted split tile underdrains, which will collect the effluent and lead it to other collectors near the outside walls, which later unite in one main outlet that discharges into the existing laundry sewer.

A sludge bed having an area of 1,800 square feet will be placed at the lower end of the filter beds. This bed will receive the sludge that may accumulate in the septic tanks and have to be removed from time to time.

The relative location of the septic tank, the sprinkling filter and the sludge bed will have to be determined after a careful survey of the site selected has been made by the engineer who will supervise the construction of the work.

An estimate of cost will now be given of the two systems of collecting sewers as outlined above and of the septic tank and sprinkling filters comprising the sewage disposal plant. These estimates include the items for plumbing and materials made necessary at each building by reason of the change of connection from the present to the proposed system of sewers. The estimates include also an item for engineering for preparing final contract plans and specifications and for superintendence during construction of the work. These estimates are as follows:

SYSTEM A. Sewers shown in full lines. Disposal plant located 1,000 feet northeast of reservoir.

Sewer system.

5,600 lineal feet 6-inch sewers, at 50 cents	$2,800 00	
7,200 lineal feet 8-inch sewers, at 70 cents	5,040 00	
1,300 lineal feet 10-inch sewers, at 85 cents	1,100 00	
2,250 lineal feet 12-inch sewers, at $1	2,250 00	
770 lineal feet 10-inch cast iron inverted siphon, including special manholes and overflow sewer	1,190 00	
58 manholes at $40 and 5 flush tanks at $60	2,620 00	
Plumbing necessitated by new sewers	1,000 00	
		$16,000 00

Septic tank		
3,130 cubic yards earth excavation, at 50 cents	$1,565 00	
925 cubic yards concrete in tank, at $7	6,475 00	
Piping, valves, etc., including screens	1,100 00	
Sludge bed and sludge sewer	275 00	
Building over septic tank	6,000 00	
		$15,415 00
Sprinkling filters		
3,580 cubic yards excavation, at 50 cents	$1,790 00	
600 cubic yards concrete in walls, at $7	4,200 00	
2,500 cubic yards screened coke filtering material, at 80 cents	2,000 00	
Sprinkling system, drain tile system, including pipes, valves, etc	4,265 00	
		12,255 00
		$43,670 00
Add 10 per cent. for engineering and contingencies		4,367 00
Total		$48,037 00

SYSTEM B. Sewers shown in dash lines. Disposal plant located near junction of Dairy road and St. Johnsland road.

Sewer system		
5,600 lineal feet 6-inch sewers, at 50 cents	$2,800 00	
7,450 lineal feet 8-inch sewers, at 70 cents	5,215 00	
3,050 lineal feet 10-inch sewers, at 85 cents	2,600 00	
2,100 lineal feet 12-inch sewers, at $1	2,100 00	
50 manholes and 5 flush tanks	2,660 00	
Plumbing as per System A	1,000 00	
		$16,375 00
Septic tank		
As per System A		15,415 00

Sprinkling filters	
As per System A..............................	$12,255 00
	$44,045 00
Add 10 per cent. for engineering and contingencies..	4,404 00
Total..............................	$48,449 00

It will be seen that the estimated cost of the two systems of collecting sewers and disposal plants, "A" and "B," are approximately the same. After a discussion of the availability of these two sites with the managers of the Kings Park State Hospital and a careful consideration of the relative engineering and sanitary advantages of all of the various methods of collection and disposal of the sewage of the institution, I beg to recommend that the plan considered above under "A," shown in full lines upon the accompanying plan, with purification works composed of septic tanks and sprinkling filters constructed in accordance with the accompanying detailed plan, be adopted. The estimated cost, as shown above, is $48,037, and I would, therefore, recommend that $50,000 be appropriated for carrying out the work.

Very respectfully,

THEODORE HORTON,
Consulting Engineer

NEW YORK STATE CUSTODIAL ASYLUM AT NEWARK

This institution is provided with a system of sewers which can discharge with facility into the proposed new sewerage system of Newark, and the matter of joint disposal was for some time under consideration by the village and the asylum authorities. Owing, however, to a failure to agree upon the amount of cost a decision for independent disposal of the asylum sewage was reached.

The preparation of plans for an independent sewage disposal plant for this asylum are now in progress and will be completed at an early date.

HUDSON RIVER STATE HOSPITAL, POUGHKEEPSIE

The matter of the pollution of the Hudson river by the sewage of this institution and the possible contamination of the Poughkeepsie water supply, which is taken from the river a short distance below the point of sewage discharge, was formally brought to the attention of the Department by the Hon. John I. Platt of Poughkeepsie and was made the subject of a careful examination and report by the consulting engineer.

ALBANY, N. Y., *December* 26, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In the matter of the pollution of the Hudson river by the sewage from the Hudson River State Hospital at Poughkeepsie and the danger thereof to the water supply of that city taken from the Hudson river near the point of sewage outlet, which has been again recently called to the attention of the Department by Mr. J. I. Platt, I have in accordance with your direction visited Poughkeepsie and made an investigation of the alleged conditions and beg to report as follows:

The matter was made the subject of an investigation and report to the Department in 1893 by Mr. C. C. Brown, consulting engineer. His report showed that the river was contaminated by the sewage from the State hospital in such a way as to endanger the quality of the Poughkeepsie water supply and recommendations were made that the State hospital be required to purify the sewage before discharging it into the river.

These recommendations were transmitted to the authorities of Poughkeepsie, but nothing has been done by the city up to this time owing to a general understanding at that time, as expressed by the recent letter of Colonel Fowler dated December 19th that "while the board of health could compel the improvement to be made, the cost would fall upon the municipality making the complaint." Nor have any steps been taken by the State hospital authorities, possibly owing to the same understanding and partly upon the grounds that the city of Poughkeepsie was a party to an equal or greater pollution of the Hudson river with the institution.

The essential facts in regard to the pollution of the Hudson river at Poughkeepsie may be stated as follows:

The Hudson River State Hospital is an institution for the insane, numbering about 2,300 inmates. The sewage is collected in a system of sanitary sewers and discharged into the Hudson river about 2,700 feet above the intake of the Poughkeepsie water works.

The city of Poughkeepsie has a population of 25,000 and is provided with a combined sewerage system with three main outfall sewers discharging into the Hudson river. One serves about one-half the population of the city and discharges into the Hudson river about 5,000 feet below the intake. Another serving about one-quarter the population discharges about 6,000 feet below the intake. The third outfall serving also about one-quarter of the population discharges about 9,000 feet below the intake.

The public water supply is taken from the Hudson river about one mile above the center of the city through an intake 150 feet from shore and 35 feet below mean high water. The supply is filtered through slow sand filters. Improvements are now being made to the filters by covering them so that trouble from ice will be avoided during the winter time. There are many wells in use in the city as a result of a prejudice of some people to drink Hudson river water, notwithstanding its purification.

The Hudson river at Poughkeepsie is subject to tidal influences, though the water in the river does not become brackish except during unusually low stages of the river, such as took place in the summers of 1880 to 1883. The range of tide is 3.6 feet and the average range of travel of the tide is from two to four miles in each direction during each course of the tide. This travel of the tide varies greatly, and occasionally, at times of high water in the river, there is no flood movement of the tide.

As a result of this tidal action it is evident that the sewage from both the city sewers and from the hospital must flow past the intake of the water supply. An important factor is, however, that from the configuration of the shores of the river at Poughkeepsie the flow of the flood tide is deflected out into the stream so that the sewage from the city sewers is, in a measure, prevented from reaching the intake. That some of it, however, in a more or less diluted state, reaches the intake is very probable. With

the sewage from the hospital the conditions are different, for on the ebb tide the configuration is such that this sewage has a tendency to hug the shore and be carried more directly to the intake. Mr. Fowler, superintendent of public works, stated that he has traced fæcal matter directly from the outlet of the hospital sewer to the intake of the water supply.

As to the relative contamination of the water supply at the intake by the hospital sewage with its small volume but more dangerous character and more direct course to the intake, and by the city sewage with its large volume but less direct path to the intake, is a matter that has not so far as I know been studied, and could not be well determined without considerable study and engineering observations.

It is clearly evident, however, that there must be considerable contamination of the water at the intake from the sewage of both the city and the hospital and that the sand filters have been the only safeguards of the city against this contamination. That this safeguard is not absolute is rather self-evident, and, further, the fact that recent improvements have been made to these filters indicates that improvements and additional safeguards were considered necessary.

In view of the foregoing, I am of the opinion that with the proximity of the sewage contamination from sewers of both the city and the hospital that, in addition to purification of the Poughkeepsie water supply, sewage purification should also be adopted not only by the State hospital but by the city itself. The latter is evidently admitted in so far as that a possible route for an intercepting sewer to carry the sewage of the city to a suitable place below the city for purification has been considered and found to be practicable.

In view of the advisability if not urgency of construction of sewage treatment works by both the State hospital and the city of Poughkeepsie, I recommend:

1. That this Department urge upon the State Board of Lunacy the necessity of constructing sewage treatment works for the purification of the sewage from the Hudson River State Hospital.

2. That similar recommendations in regard to the purification

of the sewage of the city of Poughkeepsie be urged upon the proper officials of that city.

The question of payment for sewage purification works for the hospital has not been considered in the foregoing recommendations, since the matter is a legal one, but in order that some definite recommendations could be given at this time I have assumed that the expense for sewage treatment for the State hospital would be borne by the State.

Respectfully yours,

THEODORE HORTON,
Consulting Engineer

ALBANY, N. Y., *January* 3, 1907.

Hon. JOHN I. PLATT, *Poughkeepsie, N. Y.:*

DEAR SIR:— I inclose you herewith a copy of the report of the consulting engineer of this Department on his recent investigation of the conditions of the Poughkeepsie water supply.

I am also sending a copy to the mayor of the city and to the Lunacy Commission, and will take this matter up with them as soon as they have had an opportunity to consider it; and I assure you that I will do anything in my power to help bring about a satisfactory determination of the matter.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *January* 3, 1907.

Hon. T. E. MCGARR, *Secretary Lunacy Commission, Albany, N. Y.:*

DEAR SIR:— I inclose you herewith a copy of the report of the consulting engineer of this Department on a recent examination made by him of the conditions existing at the city of Poughkeepsie.

The recommendations contained in this report meet with my approval and I trust that your board will see fit to take some steps in this matter.

I am also sending a copy of this report to the mayor of the city of Poughkeepsie and will be glad to do anything I can to facili-

tate action in this matter or to bring about a more satisfactory condition of affairs.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

ROME CUSTODIAL ASYLUM

Plans for sewage disposal of this institution were prepared in August, 1906, and turned over to the office of State Architect for final development. The plans provided for instituting a septic tank at the present time with ultimate provision for final treatment by sand filtration.

Since these plans were the first prepared by this bureau and owing to pressure of other work at the time they were prepared, no accompanying report was submitted.

ROCHESTER STATE INDUSTRIAL SCHOOL

During November and December, 1906, plans for sewerage and sewage disposal of this institution were prepared.

The large area covered by the school buildings and the separation of the buildings, or groups of buildings, one from another, made it expedient to collect and dispose of the sewage by six independent small systems of sewers and disposal plants. The availability of sand of a favorable size and quality resulted in the adoption of purification by septic tanks followed by natural or artificial sand filtration.

The report of Assistant Engineer H. N. Ogden, under whose supervision these plans were prepared, is submitted herewith.

ITHACA, N. Y., *January* 7, 1907.

MR. THEODORE HORTON, *Consulting Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR:— I have the honor to submit the following report on the sewage disposal plants of the Rochester State Industrial School in the town of Rush, as follows:

The institution is one for the care and reformation of wayward boys and has been in existence for some years at Rochester. The

present site at Rush is to be a substitute for the past one at Rochester although at present, on account of the incomplete condition of the plant at Rush, a portion of the institution exists in Rochester and a part in Rush. Many of the proposed buildings are not yet erected and some of those erected are not yet occupied because of lack of water or other reason. In the plans made it is assumed that all the buildings contemplated and shown on the plans of the State architect will be erected and occupied by their full quota of inmates. This full number includes twenty-one cottages, each containing twenty-five boys with a supervisor and matron, or twenty-seven in all; a total for the institution of 567. Seven farm buildings are on the place, each with a present capacity of about twenty boys, with supervisor and matron, or 154 in all. There are also contemplated six cottages for teachers, mechanics, etc., each containing ten persons, or sixty more; a total population of 781 persons. The present population, while continually increasing and changing, is probably not yet 500 persons.

The water supply is derived from wells and springs, the water from which is pumped to elevated tanks for pressure. The plumbing in the cottages consists of kitchen sink, two water closets, four wash-stands, one slop-sink and one shower bath. Each cottage is provided, or will be provided, with an outside privy for use by the boys during the daytime. The laundry work is done at present in Rochester, but will be done in a separate laundry building and at no time in the cottages. By experience in Rochester, the superintendent estimates the flow, with city pressure and with closets in the buildings for use during the day, at twenty-six gallons per head per day, this including water used in the laundry. The purely domestic supply, therefore, at Rush, laundry excluded, and with the check on waste due to the method of supply, is fixed at thirty gallons per head per day. To this is added twenty gallons per head per day, to take care of the water used in the barns which are adjacent to each cottage and which are to contain two horses and about six head of cows. The capacity of the pipes is fixed by a computation assuming a maximum flow to be twice the average daily flow.

The site of the institution is on the east side of the Genesee

river, from the edge of which to the embankment of the Erie railroad, which runs through the grounds, is a level flood plain, about 2,000 feet wide, nearly all of which is flooded by the spring freshets. From the railroad easterly, the ground rises to a ridge, the crest of which is 200 feet above the river, the distance varying from 1,500 to 2,500 feet. The grades are therefore ample in the direction of the slope and the computations show that the sizes chosen are ample for the assumed flows. Across the slopes minor valleys are encountered which prevent or interfere with a general accumulation of the sewage.

The amounts of sewage are based on the house flow alone, no roof or gutter water being admitted. Manholes are assumed to be built at intervals of about 400 feet, their exact location to be determined at the time of construction.

On account of the minor east and west valleys referred to above, it has seemed most advantageous to plan separate disposal plants as shown on the plans for separate groups of cottages, the method of disposal for each being similar and the only difference consisting of the size variation of the integral parts of the plants. In each case the sewage is received in a manhole or grit chamber, so drained that the sewage may flow either into the septic tank adjoining, or by means of a by-pass, around the tank if desired. The tank is to be of concrete, with steel rods inserted, designed to hold in each case about one-half of the daily flow. A weir and apron at the lower end of the tank serve to aerate the sewage as it falls into the siphon chamber. This latter chamber, by means of automatic siphons discharges the sewage intermittently onto the filter beds, designed to filter at the rate of 150,000 gallons per acre per day. These beds are to be artificial, and made from the sand and gravel, which is in abundance on the grounds and can be screened to any size as seems most economical when construction commences. Sand of an effective size of about 0.35 mm. would be desirable, if it can be screened out at reasonable cost.

The general locations of the beds and tanks are shown on the plans, but the exact location on the ground, with reference to the streams and railroad, since all the plants, except those at the extreme south, are in the immediate vicinity of the railroad, must be determined at the time of construction. The estimate of cost which follows and the studies of the propriety of building sepa-

rate plants for certain groups or of combining such groups, is based on the following unit prices, suggested by yourself in our conference of January 2d.

Concrete, including forms and carpenter work..	$8 00	per cu. yd.
Steel rods, including placing and holding.....	04	per lb.
Earth work, including digging and placing....	40	per cu. yd.
6-in. pipe, laid, including manholes, 400 ft. interval	35	per lin. ft.
8-in. pipe, laid, including manholes, 400 ft. interval	50	per lin. ft.
Sand for beds, sifted, and placed............	1 25	per cu. yd.
Underdrains for beds laid, including trenching.	05	per lin. ft.

In comparing the relative advantages of separate sites for the several plants, rather than the possibility of combining one or more of the separate plants to make combined plants, I have computed in every case the cost under such an assumption and find the combination to be more expensive than the separate plants adopted.

For example, the disposal plant for one cottage is estimated to cost, exclusive of the pipe line from the house to the plant, $556. If group one and farm C are combined, the additional pipe needed will cost about $840, and the extra size of the plant for two cottages will add $90 to the cost of the plant for one, a total of $930 for the combination, as against $556 for the separate plant. The difference is not so marked in other comparisons, but the investigation has been made, with the same results.

When the plants are constructed the determination of the elevation of the surface of the tanks and beds must be carefully made, since the elevation of high water on the flats is 539, according to the superintendent, and the flooding of the flats at a level of 530 is almost an annual occurrence. For this reason it has seemed best to me to keep the cottages on plan two separate from those on plan three, since the latter are at such a level that the plant for their sewage can be at a level about ten feet higher than that which cares for the sewage from group fifteen. The latter plant will occasionally be submerged at times of maximum flood, and it seems best to limit this condition to as few cottages as possible.

I enclose an estimate of the cost of construction, assuming that the entire work will be done by contract and not by the labor of the boys, for whom, the superintendent says, there is more work ready and imperative than they can do in a number of years.

Respectfully submitted,

HENRY N. OGDEN,
Assistant Sanitary Engineer

Estimated Cost of Proposed Sewage Disposal Works at the State Industrial Institution in the Town of Rush, N. Y.

Sheet 1

600 feet 6-inch pipe laid, at 35c......	$210 00	
Valves, iron pipes, siphon, etc.......	125 00	
Concrete, 20 cu. yds., at $8..........	160 00	
Steel rods, 1,760 lbs., at 4c...........	70 40	
Earth work, tank and beds, 300 yds., at 40c..........................	120 00	
Sand and gravel for beds, 30 yds., at $1.25..........................	37 50	
Underdrains, 80 lin. feet, at 5c.......	4 00	
Sodding and seeding...............	50 00	
		$776 90
Ten per cent. for engineering and contingencies.		77 69
Estimated cost for one cottage, sheet 1...........		$854 59

Sheets 2, 3 and 4

3,100 (av.) feet of 6-inch pipe laid, at 35c..........................	$1,085 00	
Valves, iron pipes, siphon, etc........	150 00	
Concrete, 25 cu. yds., at $8..........	200 00	
Steel rods, 2,350 lbs., at 4c..........	94 00	
Earth work, tank and beds, 450 yds., at 40c..........................	180 00	
Sand and gravel for beds, 128 yds., at $1.25..........................	160 00	

Underdrains, 150 lin. feet, at 5c......	$7 50	
Sodding and seeding	50 00	
		$1,926 50
Ten per cent. for engineering and contingencies..		192 65
Estimated cost for four cottages, sheets 2, 3, and 4..		$2,119 15

Sheet 5

1,275 feet of 8-inch pipe laid, at 50c...	$637 50	
15,600 feet of 6-inch pipe laid, at 35c..	5,460 00	
Valves, iron pipes, siphons, etc........	375 00	
Concrete, 85 cu. yds., at $8..........	680 00	
Steel rods, 4,000 lbs., at 4c..........	160 00	
Earth work tank and beds, 1,800 yds., at 40c.	720 00	
Sand and gravel for beds, 1,000 yds., at $1.25	1,250 00	
Underdrains, 400 lin. feet, at 5c......	20 00	
Sodding and seeding..............	100 00	
		$9,402 50
Ten per cent. for engineering and contingencies.		940 25
Estimated cost for equivalent of 30 cottages.......		$10,342 75

Sheet 6

2,800 feet of 6-inch pipe laid, at 35c..	$980 00	
Valves, iron pipes, siphon, etc........	150 00	
Concrete, 25 cu. yds., at $8..........	200 00	
Steel rods, 2,150 lbs., at 4c..........	86 00	
Earth work, tank and beds, 375 yds., at 40c.	150 00	
Sand and gravel for beds, 87 yds., at $1.25	108 75	
Underdrains, 150 lin. feet, at 5c......	7 50	
Sodding and seeding	50 00	
		$1,732 25
Ten per cent. for engineering and contingencies.		173 22
Estimated cost for three cottages, sheet 6........		$1,905.47

Total Estimated Cost

Two plants, one cottage each, at $854.59........	$1,709 18
Three plants, four cottages each, at $2,119.15.....	6,357 45
One plant, equivalent of thirty cottages..........	10,342 75
One plant, of three cottages....................	1,905 47
Total cost as estimated....................	$20,314 85

NEW YORK STATE HOSPITAL FOR CRIPPLED AND DEFORMED CHILDREN, WEST HAVERSTRAW

On December 6, 1905, a provisional permit was issued to the board of managers for the discharge of sewage of this institution into Hudson river, upon condition that a sewage disposal plant be constructed for properly treating the sewage on or before November 1, 1906. The matter of sewage disposal was given immediate consideration by the hospital authorities as set forth in the following correspondence and report of the consulting engineer.

ALBANY, N. Y., *December* 14, 1905.

Hon. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— Your favor of the 6th inst., addressed to the board of managers of the hospital was duly received. We note that permission is granted the board to construct the sewer, provided that the sewage disposal plant is connected with it, on or before November 1, 1906.

We have already made application through the State Board of Charities and the fiscal supervisor for the necessary appropriation to construct the sewage disposal plant.

Mr. Heins informs me that the amount you indicate as necessary for this, is $4,000, not including the price for the land. We have added an additional $1,500, making the total amount asked for $5,500.

We also understand that the proposed plant will meet the demands of 150 people only. We are about to ask the Legislature for a hospital accommodating 400 or 500 patients. Our board

thinks that the sewage disposal plant, when erected, should meet the demands of this number. Will you kindly indicate to me if this meets your views, and also state the amount required.

Yours truly,

NEWTON M. SHAFFER,
Chairman Executive Committee

ALBANY, N. Y., *January* 5, 1906.

Dr. NEWTON M. SHAFFER, 28 *East 38th Street, New York:*

DEAR SIR:— Replying to your communication of December 14th, regarding the sewage disposal plant at the New York State Hospital for Crippled and Deformed Children, this matter was referred to the consulting engineer of the Department, and he has made a report to me in which he states that he is unable to make a close estimate of the cost for the reason that he is not familiar with the local conditions. I have therefore requested him to go to Haverstraw at once and make an examination in order that he may be able to make an accurate estimate of the cost. He will visit the institution within a short time and will notify you when he is going so that you can meet him if you so desire. Prof. Olin H. Landreth of Schenectady is the consulting engineer to whom I refer.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

SCHENECTADY, N. Y., *January* 26, 1906.

Dr. E. H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:—Agreeable to your recent request that I visit the State Hospital for Crippled and Deformed Children at West Haverstraw, for the purpose of estimating the probable cost of a system of sewage disposal to be used in connection with the recently-constructed sewer system of that institution, I beg to say that I visited the hospital on January 6th, and went over the line of the sewers now being built with Dr. Whitney, the resident surgeon. As a result of my examination and calculations, based

thereon, I am of the opinion that the most suitable system of disposal to employ at the hospital will be a septic tank, placed just below the West Shore railroad, on the line of the sewers with the effluent from the tank passing through one of a series of continuous-percolating filters used in rotation.

I estimate the cost of such a system of disposal, apart from the land, to be for a population of 500 people, $12,000.

If the feature of the percolating filters be temporarily omitted, which may in my opinion be done for the present while the stated population is being developed, the estimated cost would be $9,000. The full plans should, however, be worked out at the outset in order that the two features may be economically constructed when actually built.

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer

II.

PROTECTION OF PUBLIC WATER SUPPLIES

II(a). EXAMINATION OF WATER SUPPLIES

Dunkirk

Dunkirk, N. Y., *March* 9, 1906.

State Department of Health, Albany N. Y.:

Gentlemen:— The prevalence of several cases of typhoid fever in this city resulted in an analysis of our water supply, a report on which was received through your Department some days ago and submitted to the local board. Said analysis shows pollution. I am convinced that the fever has arisen on account of impurities in our water supply, and at a meeting last night a resolution was adopted directing the trustees of Fredonia, N. Y., to abate the nuisance of draining sewage from the town into Canadaway creek, which is contaminating the waters of said creek, and as it empties into Lake Erie near our intake pipe, it naturally is polluting the waters in the lake. There appears to be no doubt of this contamination as in time of freshets it is plainly evident that the water is polluted.

The official notice is served to-day on the Fredonia authorities to discontinue draining into this creek for the protection of the people of Dunkirk, and I have been instructed to communicate with the State Department and seek advice and recommendations in this matter and to inform us what further action we may take in the premises to protect the lives of our people, in the event of the failure of the Fredonia authorities to comply therewith.

Kindly give me any special advice you can in the matter, and oblige,

Yours respectfully,

G. E. ELLIS, M.D.,
Health Officer

Amsterdam, N. Y., *August* 20, 1906.

Eugene H. Porter, M.D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:— At your request and in answer to a call from Dr. G. E. Ellis, health officer of the city of Dunkirk, I had a talk with him at Dunkirk on the fifteenth of this month in regard to the question of investigating the city water supply. I arranged with Dr. Ellis to have forwarded to him from the Department ten jars for samples of water. Dr. Ellis will take samples at two-day intervals, (1) from Lake Erie at the mouth of Canadaway creek, (2) from Lake Erie near the intake to the supply pipe (Dunkirk deriving its main water supply from Lake Erie), (3) from Gerran's pond, and (4) possibly from a point along the shore of the lake midway from the outlet of Canadaway creek to the intake.

The purity of the water in Canadaway creek is questionable from the fact that the sewage from Fredonia is discharged into the creek.

If, on examination, these samples show sewage pollution, the board of health will suggest to the water commissioners that the State Department of Health be asked to formulate rules and regulations for the protection of its water supply, since, in rainy seasons, when the water in Canadaway creek becomes roiled, a current from the mouth of this creek can be traced to the intake pipe of the city supply.

As soon as Dr. Ellis receives the jars for samples he will undertake the investigation.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

Ticonderoga

At the request of the local health officer an inspection was made of the water supply of the village of Ticonderoga, Essex county.

Recommendations were made to the village authorities in respect to the improvement of the water supply and sewerage. The correspondence and reports in the matter follow:

TICONDEROGA, N. Y., *November* 12, 1905.

HON. EUGENE PORTER, M.D., *State Commissioner Health, Albany, N. Y.:*

DEAR DOCTOR:— As health officer of the town and village of Ticonderoga, N. Y., I should like to report to you the condition of the town and village as regards the disposal of sewage. The town owns only one short line of sewer, a matter of 400 feet, and this on a side street. Nearly the whole town sewage is dumped into three or four gullies bordered by residences their whole length, and finally drains into Lake George outlet or creek.

At the lower part of each of these gullies the condition of things is pretty bad, and naturally those living near are continually complaining to the board of health. I investigate and recommend proper drainage, but the several boards *do nothing,* and things have reached such a pass that they (people) are ready to "mob" me if something is not done. I should be obliged if you would instruct me what to do or send an inspector here to look things over. Another great source of danger to town is fact that about forty houses on Water street, which parallels Lake George outlet, drain directly into the creek above the source of our water main, which has no filter over its mouth or even a screen, for eels and dead fish are frequently taken out of the pipes in the village.

Trusting to hear from you at your convenience, I remain

Sincerely yours,

G. H. BEERS

SCHENECTADY, N. Y., *December* 29, 1905.

DR. E. H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— On December 14th you submitted to me a communication from Dr. G. H. Beers, health officer of Ticonderoga, N. Y., dated November 12th, relative to unsanitary conditions existing in the village of Ticonderoga, due to the improper discharge of sewage into ravines in the village, and also due to a probable pollution of the water supply of the village arising from sewage pollution.

In response to your request for my judgment as to what steps shall be taken in this matter, I beg to reply that I am not at all

familiar with local conditions in Ticonderoga and, therefore, I am unable to recommend definite steps of improvement; but it would seem that the alleged seriousness of the sewerage conditions, and particularly the alleged danger to the public water supply, would render a local examination necessary.

Returning the letter in question, I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,
Consulting Engineer

AMSTERDAM, N. Y., *January* 6, 1906.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.*:

DEAR SIR:— In accordance with your instructions dated January 3, 1906, on January 4th I visited the village of Ticonderoga to investigate an alleged pollution of the public water supply, and beg to report as follows:

The village of Ticonderoga, incorporated in 1888, lies on either side of Ticonderoga creek, which stream is the outlet of Lake George and flows north into Lake Champlain. The village is situated about two and one-half miles south of Lake Champlain and about two miles north of Lake George. The population at present is about 1,500.

In 1874 the village authorities constructed what is known as the Lake George water supply system, and this system, as well as the Chilson Hill high level system, constructed in 1892, is owned and operated by the village.

The intake to the twelve-inch main of the Lake George system is located at a point in Ticonderoga creek about forty feet south of Bridge street and twenty-five feet west of the east bank of the stream, which is about seventy feet wide at this point. This point is just outside the corporation limits and about one mile from the business section.

On the west side of the stream, just south of Bridge street, is located the W. J. Smith Lumber Company's sawmill. The dam of The International Paper Company, located downstream and about 200 feet north of the intake, is of sufficient height to back water nearly if not quite to Lake George.

During the winter months, when navigation is not interfered with by so doing, the pond level is drawn down in operating the paper mill so as to reduce the depth of water over the intake to the water supply main from a depth of five or six feet to a depth of two or three feet.

In company with Health Officer G. H. Beers, M. D., I visited the source of supply of the water system as above described, and he pointed out to me the source of contamination referred to in his complaint to the Department. Water street, which runs about at right angles south from Bridge street and lies from 100 feet to 200 feet east of Ticonderoga creek, is wholly outside the corporation. The land on each side of Water street, forming a strip from 200 to 500 feet wide and about three-fourths of a mile long, drains into the stream above the intake; and on this slope are located upwards of forty dwellings, all having outside privy vaults excepting in the case of the Alexandria hotel. This is a small hotel near Bridge street, and a sewer leads from this hotel and now discharges, as for several years past, at the east edge of the stream about twenty feet upstream from the intake. The water supply for these dwellings is obtained from wells and from a spring located easterly from the drainage area above described.

In November, 1905, Health Officer Beers discovered a case of typhoid fever in a house at the southerly end of Water street, about three-fourths of a mile from Bridge street, located on the watershed draining into Ticonderoga creek. Subsequently two more cases of typhoid fever developed in the same house, none of them fatal. The first case was brought by the patient from some outside locality.

In a house on Second street in the village there is at present a case of typhoid fever of twelve days' standing. The water consumed by this house is taken from the Lake George supply system. On House street there is also a case of ten days' standing. The water used in this house is taken by pails from Ticonderoga creek, several hundred feet downstream from the intake, there being no water mains in this street.

When the first case was discovered in the house on Water street, the excreta was being deposited in barrels at the rear of the house, at a point 200 feet east of the stream on a well-defined slope drain-

ing into the stream. The health officer ordered the contents of these barrels to be buried, but on the 4th day of January the barrels and contents had not been disturbed.

There can be no doubt that the Lake George water supply for the village is now and has been for years in great danger of pollution, if not actually contaminated, by reason of the above-described unsanitary conditions. To remedy these conditions one of two propositions may be followed out.

First. The present Lake George main may be continued south from the present intake, either in the stream or on either bank, for a distance of about one mile, past the populated district and into deep water in Lake George at some point near Prisoner's island. The nearest settlement above this point is Baldwin, about one mile south, where fifteen or twenty summer camps are located.

Second. The Chilson Hill high level system may be extended so as to tap a supply of water sufficient for the entire consumption of the village.

The distributing reservoir for the Chilson Hill system is situated three miles west of the village and the supply derived from Arthur brook. In times of low flow, both in winter and in summer, the supply is inadequate for even high-level service, so that water has to be pumped from the Lake George system to the high-level system which lies west of the creek. By laying a conduit from Goose Neck lake to the Chilson Hill distributing reservoir, a distance of seven miles, sufficient water would probably be obtained to admit the discontinuing of the Lake George system. This plan would give greater pressure for fire purposes and obviate the necessity of pumping at any time from the Lake George system. Water supply mains from the two systems parallel each other throughout most of the village and may be interconnected at will, but at this time approximately one-half the water consumed is furnished by each system.

The relative merits of these two plans call for investigation and study by the village authorities for the improvement of the water supply, and one or the other should be adopted.

There is no general sewer system in the village. A sewer about 1,000 feet in length on Prospect and River streets discharges into a sewer on West Exchange street, which in turn discharges into

the creek at the point where the creek crosses West Exchange street.

A sewer on Second street and a sewer from the new schoolhouse on the corner of William and Sample streets, running across private property, discharges into a sewer near Lake George avenue. This Lake George avenue sewer is partly an open ditch or ravine and partly a closed culvert and discharges into the creek. There is also a sewer on North and South Main streets, which receives also some sewage from a portion of West Exchange street and discharges into the creek.

There are numerous private sewers discharging into the creek or into ravines. Two of these ravines, or open ditches, discharge into the Lake George avenue ravine at a point near Third street. This brings sewage from nearly half the village into the creek just below a dam recently erected by The Ticonderoga Pulp and Paper Company, and this company has acquired water rights from the dam downstream to their plant, and from this dam a steel flume twelve feet in diameter is being laid by The Ticonderoga Pulp and Paper Company to a proposed power-house one-half mile downstream, and when completed this diversion of the waters of Ticonderoga creek will produce very unsanitary conditions.

The health officer states that complaints are frequently received from property owners of nuisances arising from this method of disposing of sewage, *i. e.*, discharging into ravines or ditches.

At some early date the question of proper sewerage must of necessity be looked into by the village authorities.

In 1902 a plan of sewers for the entire village was drawn up, but this plan provides for several different outlets and probably would not provide an adequate system in all respects.

The present village officers are as follows: President, R. J. Scott; treasurer, J. D. McCormick; health officer, G. H. Beers, M. D.; trustees, W. H. Lamson and Edward Stanton.

There is no separate sewer commission.

The bonded debt of the village is as follows: Water system bonds, $62,000; school bonds, $8,000; fire department, $3,500.

In addition a proposition to bond the village for $45,000 for school purposes was carried in 1905. Bonds are not yet issued.

It is expected that $10,000 of water bonds will be retired in 1907.

The village board of health is constituted as follows: H. W. Treadway, president; Myron J. Wilcox, Lyman Malcom.

The town of Ticonderoga board of health consists of: Jed W. Bullen, supervisor; W. B. Coates, town clerk; R. V. Smith, Orville Phillips, W. E. Henry, W. W. Wright, justices of the peace; N. D. Peck, M. D., citizen member; Roy Lockwood, secretary of town and village health boards and village clerk.

There are several populated districts in the town adjoining the corporation lines of the village, so that many matters relating to the public health must be considered jointly by the two boards.

On the evening of January 4th I attended such a joint meeting of the health boards and the question under consideration was discussed. It was conceded unanimously that the situation called for action to prevent a continuance of the unsanitary conditions heretofore outlined, and on a first review of the matter it was thought expedient that the Lake George supply main be extended as suggested above, though no formal action was taken.

Respectfully submitted,

H. B. CLEVELAND,

Inspecting Engineer

SCHENECTADY, N. Y., *January* 12, 1906.

Dr. E. H. PORTER, *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR:— In the matter of the alleged unsanitary conditions in the village of Ticonderoga, Essex county, N. Y., due to the suspected pollution of the public water supply, the correspondence regarding which you placed in my hands on January 3d, I beg to report that I at once directed Mr. H. B. Cleveland, inspecting engineer of this Department, to proceed to Ticonderoga for the purpose of making a personal inspection of the local conditions and circumstances.

I enclose herewith Mr. Cleveland's report, dated January 6th, describing the local situation. This report and the letter from Dr. G. H. Beers, health officer, constitute my only sources of information regarding the situation in the village.

From the above information it would seem that the village is in a precarious situation as regards its water supply, and is also, both for this and for other general sanitary reasons, greatly in need of an improved system of sewerage. The water supply is clearly in need of protection from pollution which is threatened by existing conditions.

This protection should be secured not only by radical changes of the place or manner of taking the supply, but, pending the execution of such permanent improvements, the supply, as at present taken, should be protected from the serious danger arising from the three existing or recent cases of typhoid in the house at the southerly end of Water street referred to by Mr. Cleveland in his report. The report indicates that the ordinary precautions to prevent infection from this center, which precautions are reported to have been ordered by the health officer (presumably of the town board of health), have not been executed. The reason for the failure to enforce this reasonable and essential order is not stated in the report.

This temporary protection should also include a close inspection by the local board of health and the enforcement of necessary precautions against the pollution of the supply from the other houses situated along the line of the stream above the intake. The threatened danger from the sewer from the small hotel near Bridge street, should, of course, be immediately removed, either by discontinuing the sewer altogether, or by diverting it to a point lower down stream.

I am, of course, unable to form an impression, with my present limited knowledge of the local situation, as to the best form which the permanent and radical improvements of the water supply should take, and therefore have no suggestions to make on this point.

From the conditions stated in Dr. Beers' letter, and in the report, it would seem that a modern system of sewerage for the village was imperatively demanded in order to rectify existing conditions. It is possible, if such a system were installed, that it might obviate the need of radical changes in the water system, although I do not know enough of the local conditions to form a

definite opinion on this subject. The procedure to be followed in providing for a complete sewer system is clearly outlined in article X of the Village Law, which article deals with the matter of sewers exclusively. The first step in this procedure is the execution of a careful sanitary survey of the village by a competent engineer skilled in the design and construction of modern sewerage and sewage disposal, and the submission of this plan for approval to the State Department of Health.

In view of the seriousness of the water situation at Ticonderoga, I beg to recommend:

(1) That the board of health of the town of Ticonderoga be directed, under section 25 of the Public Health Law, to issue and enforce an order providing for the thorough and continued removal of all the infectious matter originating with the three cases of typhoid reported on Water street, as well as all such matter originating with any other or future cases situated on the drainage area tributary to the village water supply; and that the town board of health be directed to report to this Department at a specific and early future date, as to the steps in detail which have been taken in compliance with this order.

(2) That before giving a mandatory order the board of trustees and the board of health of the village of Ticonderoga be recommended to give prompt consideration to the question of a permanent and improved modern system of sewerage and sewage disposal for the village; and to report to this Department at an early stipulated date what action has been taken in the matter.

(3) That the board of trustees and the board of health of the village of Ticonderoga be recommended to secure the services of a competent sanitary engineer, experienced in water supply engineering, to examine the situation and to advise them as to the best and most economical manner of securing whatever permanent improvements in the water supply may be found necessary.

As this question of water supply improvement is closely related to that of a system of sewerage, it would be very desirable if a competent engineer could be secured to take both matters under consideration and, if deemed best, also to prepare complete plans for both the sewerage system and the water supply improvements.

The letter of Dr. Beers and the report of Mr. Cleveland are herewith enclosed.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,
Consulting Engineer

Albany, N. Y., *January* 18, 1906.

Mr. J. W. Bullen, *President Board of Health, Town of Ticonderoga, N. Y.:*

Take Notice.— Pursuant to the provisions of section 25 of the Public Health Law you are hereby directed to convene the board of health of the town of Ticonderoga, and take action as follows:

First. To issue and enforce an order providing for the thorough and continued removal of all the infectious matter originating with the three cases of typhoid fever reported on Water street, as well as all such matter originating with any and all other or future cases situated on the drainage area tributary to the water supply of the village of Ticonderoga.

Second. That you report to the State Department of Health on or before February 1, 1906, as to the steps in detail which have been taken in compliance with this order, such report to be adopted by your board and signed by its president.

EUGENE H. PORTER, M.D.,
Commissioner of Health

Albany, N. Y., *January* 22, 1906.

Mr. H. W. Treadway, *President Village Board of Health, Ticonderoga, N. Y.:*

Dear Sir:— Inclosed herewith you will find report of Professor Olin H. Landreth, consulting engineer of this Department, regarding an investigation recently conducted in your village regarding certain cases of typhoid fever. Your attention is particularly directed to the statements of Professor Landreth regarding your water supply and sewerage system. The importance to the health of the inhabitants of your village of protecting your water supply properly cannot be over-estimated. The situation is one which

demands prompt and intelligent action by your board of health and board of trustees.

The board of health of the town of Ticonderoga have to-day been ordered to meet and take action as recommended by Professor Landreth in his report.

No. 1. Your attention is called to the recommendations.

Nos. 2 and 3. You are directed to at once call a meeting of your board of health and advise me on or before February 3d what action your board has taken in this matter.

Any advice or assistance this Department can give will be cheerfully furnished. I trust you will notify me promptly and fully what steps you propose to take to remedy the dangerous situation.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

At a meeting of the board of health of the town of Ticonderoga, Essex county, N. Y., held January 26, 1906, at 7:30 P. M., which meeting was called by the supervisor pursuant to an order by the State Commissioner of Health to take action in regard to the three (3) cases of typhoid fever on Water street in said town, this board met jointly with the village board of health, at which joint meeting was present Dr. G. H. Beers, our present health officer, who was appointed as such by both our town and village boards of health.

Dr. Beers reported that the three cases have entirely recovered, that the house they occupied at the time of their sickness is now vacant, and that everything possible has been done to prevent the contamination of the water supply.

No new cases of typhoid have developed here since the visit of your Mr. Cleveland.

The above report of Dr. Beers was accepted.

The above is a copy of the record kept of the meeting and placed on file in the office of the town clerk.

J. W. BULLEN,
Supervisor

TICONDEROGA, N. Y., *January* 27, 1906.

E. H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— Your letter and order and also report of Prof. Landreth duly received, and in accordance with your order the village board of health held a joint meeting with the town board of health, last evening the 26th, 1906, which was also attended by a majority of the board of trustees of the village of Ticonderoga.

The health officer reported that the house where the three cases of typhoid developed and referred to in Prof. Landreth's report, is now vacant and that precaution has been taken to prevent any evil effect from what may have accumulated during the time that the fever and the inhabitants were there. No other cases have been reported in that vicinity. Two cases have since developed in the village, but they are so situated that no danger can result.

As to the water and sewer systems of the village, the board as well as the citizens are well aware of the necessity of improvement and measures will be taken toward the same, which, however, requires proper deliberation with a view to getting the best possible results with all possible economy, as the village with its present bonded indebtedness will soon be to the limit in that direction. When Mr. Cleveland was here the situation was discussed from an economic standpoint and he seemed to understand that the village could not stand the cost of a complete new system of sewerage and the necessary improvement to the water plant, but the health of the community must be protected from danger from these sources and the plan which seems to meet with the greatest approval as concerns the water is the extension of the main pipe so far into Lake George as to reach deep water at a point where the intake cannot be affected by surface drainage and as to the sewerage the system as now used can be so improved as to remove all danger.

The health officer has been instructed to take every necessary means to protect the water supply from pollution at the intake until a permanent change can be made.

The conditions are no worse than they have been for years, which in no way relieves the imperative necessity for improvement, and as the people are now aroused to an appreciation of the

danger of the situation, the interest should not be allowed to subside until the health of the community is better protected.

Further consideration of the situation will be had at an early date, the result of which will be promptly submitted to your Department.

Yours respectfully,

ROY LOCKWOOD,

Secretary of the Village Board of Health

HUNTINGTON

HUNTINGTON, L. I., *September* 24, 1906.

MR. EUGENE H. PORTER, *State Commissioner of Health, New York City:*

DEAR SIR:— The Huntington Bay and Harbor Protective and Improvement Association of Huntington, L. I., last year concluded that the water which was sold to the town by the Huntington Water Company was not as pure as it should be; in fact, was so impure that they feared great trouble might arise from its use. A committee was appointed by the association (of which I am chairman) to investigate it. They had a chemical analysis made of the water which more than convinced them that the association was right in their surmises, the chemist finding colon bacteria, etc. They then had Messrs. Waring, Chapman & Farquhar, sanitary engineers, go over the plant, which they found in a very unsanitary and filthy condition. They recommended that many changes be made at once. The committee placed their report before the water company and demanded their carrying out the engineer's requests. I am pleased to say that as far as the company can go they have put their plant in a good condition, but there still exists a very serious situation, which the association and water company would like to have corrected. The wells and pumping station are situated in a natural watershed; the water company consequently are pumping surface water and it is on this account that the existing evils are more serious. There is a stalls for horses and cattle adjoining the pumping station and the cattle are watered at a spring close to the company's grounds. The water company are unable to purchase the piece of prop-

erty on which the stable is located, except at a prohibitive price. I have appealed to the local board of health to condemn it and they have placed the matter before the town board. Last week both boards went over the property and concluded the situation was a bad one and requested me to write you and ascertain if you would not come to their assistance. The committee will be pleased to meet you at any time in the near future and go over the ground with you, when they can show you more plainly the serious conditions that now exist.

Trusting that you may find it convenient to come to us soon, as we fully realize the importance of immediate action, I am,

Yours very truly,

EDWIN A. SWEET,
Chairman

ALBANY, N. Y., *November* 14, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In the matter of the application of the Huntington Bay and Harbor Protective Association of Huntington, Long Island, for this Department to prepare water rules for the protection of the ground water supply of the Huntington Water Company, I beg to report as follows:

It appears that the water supply of the village of Huntington is taken from a series of driven wells located near Spring street in that village and that the watershed from which these driven wells receive the source of supply is rather sparsely populated. There are, however, a number of dwellings upon the watershed which, until recently, contributed a small amount of ground water pollution. In the immediate vicinity of the wells, however, there are two sources of pollution which have been considered by the association above referred to as a menace to the purity of the water supply.

One of these sources of pollution is a barn situated some 700 feet distant from the pumping station, the surface pollution from which during times of rains may reach the driven wells. The other source of pollution is a dwelling situated about 150 feet from

the line of wells. The tenant is a washerwoman, and the amount of washwater that is discharged upon the land and which ultimately must flow within sixty feet of the line of wells is considerable. The water company have attempted to purchase the property on which the barn is located, in order to remove this source of pollution, but have been unable to do so and it is owing to this that the protective association has applied to this Department for the preparation of water rules which might enable them to secure the property by condemnation proceedings.

It would seem, however, that since this barn is located at relatively a considerable distance from the wells, and that by means of a simply constructed ditch, or a short line of vitrified pipe, the pollution from both these premises could be diverted and carried to a safe distance below the pumping station and line of wells, that the preparation of water rules at this time is unnecessary. This is especially so considering that the dwellings situated upon the watershed above the wells are provided with watertight cesspools that are cleaned out at intervals.

In view of the foregoing, I should recommend that a communication be sent to the protective association explaining that the small amount of pollution resulting from the proximity of the barn and dwelling to the site of the wells can be easily diverted by a method of ditching, or the construction of a small drain, to a safe distance below the driven wells and suggesting to them the advisability of postponing the preparation of rules at this time. If, however, the changes here suggested are not found to be effective in removing the source of pollution complained of, this Department will be glad to take the matter up again, and, if necessary, to prepare rules for the protection of this water supply at some later date. In view of the fact that other dwellings are located upon the watershed, and provided with watertight cesspools, it is essential, in order to prevent a pollution of the ground water, that these cesspools be cleaned at proper intervals.

Very respectfully,

THEODORE HORTON,
Consulting Engineer

ALBANY, N. Y., *November* 17, 1906.

MR. EDWIN A. SWEET, *Chairman Huntington Bay Improvement Association, Huntington, Long Island, N. Y.:*

DEAR SIR:— Regarding the matter of the protection of the water supply of the Huntington Water Company, I beg to inclose you herewith a report of the consulting engineer of this Department upon his investigation of the subject.

You will note that he suggested the advisability of postponing the preparation of the rules at this time, but states that, if the changes are not found to be effective, the Department will take the matter up again and, if necessary, prepare rules for the protection of your water supply.

I would respectfully recommend the report to your attention and suggest that you endeavor to carry out what is outlined there. If you find you are unable to do so, the Department will then be pleased to prepare rules for you.

I enclose you herewith the report, together with the two analyses which you sent in.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

II(b). PREPARATION OF RULES FOR THE PROTECTION OF WATER SUPPLIES

Upon request of the proper authorities and in accordance with the provisions of section 70 of the Public Health Law, the following sets of rules and regulations for the protection from contamination of public water supplies, were enacted by the Commissioner of Health during the year.

Abstract of the New York State Public Health Law providing for the protection from contamination of the public water supplies throughout the State. Chapter 66 of the Laws of 1893, as finally amended by chapter 582 of the Laws of 1906.

§ 70. **Rules and regulations of department.**— The state department of health may make rules and regulations for the protection from contamination of any or all public supplies of potable waters and their sources within the state. If any such rule or regulation relates to a temporary source or act of contamination, any person violating such rule or regulation shall be liable to prosecution for misdemeanor for every such violation, and on conviction shall be punished by a fine not exceeding two hundred dollars, or imprisonment not exceeding one year, or both. If any such rule or regulation relates to a permanent source or act of contamination, said department may impose penalties for the violation thereof or the noncompliance therewith, not exceeding two hundred dollars for every such violation or non-compliance. Every such rule or regulation shall be published at least once in each week for six consecutive weeks, in at least one newspaper of the county where the waters to which it relates are located. The cost of such publication shall be paid by the corporation or municipality benefited by the protection of the water supply, to which the rule or regulation published relates. The affidavit of the printer, publisher or proprietor of the newspaper in which such rule or regulation is published may be filed, with the rule or regulation published, in the county clerk's office of such county, and such affidavit and rule and regulation shall be conclusive evidence of such publication, and of all the facts therein stated in all courts and places.

§ 71. **Inspection of water supply.**— The officer or board having by law the management and control of the potable water supply of any municipality, or the corporation furnishing such supply, may make such inspection of the sources of such water supply, as such officer, board or corporation deems it advisable, and to ascertain whether the rules or regulations of the state department are complied with, and shall make such regular or special inspections as the state commissioner of health may prescribe. If any such inspection discloses a violation of any such rule or regulation relating to a permanent source or act of contamination, such officer, board or corporation shall cause a copy of the rule or regulation violated to be served upon the person violating the same, with a notice of such violation. If the person served does not immediately comply with the rule or regulation violated, such officer, board or corporation shall notify the state department of the violation, which shall immediately examine into such violation; and if such person is found by the state department to have actually violated such rule or regulation, the commissioner of health shall order the local board of health of such municipality wherein the violation or the noncompliance occurs to convene and enforce obedience to such rule or regulation. If the local board fails to enforce such order within ten days after its receipt, the corporation furnishing such water supply, or the municipality deriving its water supply from the waters to which such rule or regulation relates, or the state commissioner of health or the local board of health of the municipality wherein the water supply protected by these rules is used, or any person interested in the protection of the purity of the water supply may maintain an action in a court of record, which shall be tried in the county where the cause of action arose against such person, for the recovery of the penalties incurred by such violation, and for an injunction restraining him from the continued violation of such rule or regulation.

§ 72. **Sewerage.**— When the state department of health shall, for the protection of a water supply from contamination, make orders or regulations the execution of which will require or make necessary the construction and maintenance of any system of sewerage, or a change thereof, in or for any village or hamlet, whether incorporated or unincorporated, or the execution of which will require the providing of some public means of removal or purification

of sewage, the municipality or corporation owning the water works benefited thereby shall, at its own expense, construct and maintain such system of sewerage, or change thereof, and provide and maintain such means of removal and purification of sewage and such works or means of sewage disposal as shall be approved by the state department of health. When the execution of any such regulations of the state department of health will occasion or require the removal of any building or buildings, the municipality or corporation owning the water works benefited thereby shall, at its own expense, remove such buildings and pay to the owner thereof all damages occasioned by such removal. When the execution of any such regulation will injuriously affect any property the municipality or corporation owning the water works benefited thereby shall make just and adequate compensation for the property so taken or injured. Until such construction or change of such system or systems of sewerage, and the providing of such means of removal or purification of sewage, and such work or means of sewage disposal and the removal of any building, are so made by the municipality or corporation owning the water works to be benefited thereby at its own expense, and until the municipality or corporation owning the water works benefited shall make just and adequate payment for all injuries to property and for all injuries caused to the legitimate use or operation of such property, there shall be no action or proceeding taken by any such municipality, officer, board, person or corporation against any person or corporation for the violation of any regulation of the state department of health under this article, and no person or corporation shall be considered to have violated or refused to obey any such rule or regulation. The owner of any building the removal of which is occasioned or required, or which has been removed by any rule or regulation of the state department of health made under the provisions of this article, and all persons whose rights of property are injuriously affected by the enforcement of any such rule or regulation, shall have a cause of action against the municipality or corporation owning the water works benefited by the enforcement of such rule or regulation, for all damages occasioned or sustained by such removal or enforcement, and an action therefor may be brought against such municipality or corporation in any court of record in the county in which the premises or property affected is situated and

shall be tried therein; or such damages may be determined by a special proceeding in the supreme court or the county court of the county in which the property is situated. Such special proceedings shall be commenced by petition and notice to be served by such owner upon the municipality or corporation in the same manner as for the commencement of condemnation proceedings. Such municipality or corporation may make and serve an answer to such petition as in condemnation proceedings. The petition and answer shall set forth the claims of the respective parties, and the provisions of the condemnation law shall be applicable to the subsequent proceedings upon the petition and answer, if any. Either party, may, before the service of the petition or answer respectively, offer to take or pay a certain sum, and no costs shall be awarded against either party unless the judgment is more unfavorable to him than his offer.

AUBURN

Rules and regulations for the protection from contamination of the public water supply of the city of Auburn, Cayuga County, N. Y.

GENERAL REGULATIONS

The rules and regulations hereinafter given, duly made in accordance with the provisions of sections 70, 71 and 72 of the Public Health Law, heretofore set forth, shall apply to the entire drainage area of Owasco lake, which forms the source of the public water supply of the city of Auburn, N. Y.

The term "lake" wherever used in these rules is intended to mean Owasco Lake. The term "watercourse" wherever used in these rules is intended to mean and include every spring, pond, lake (other than Owasco lake) stream, ditch, gutter, or other channel or permeable pipe or conduit of every kind, the waters of which when running, whether continuously or occasionally, eventually flow, or may flow, into Owasco Lake.

Wherever a linear distance of a structure or object from the lake or from a watercourse is mentioned in these rules it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the high-water mark of the lake, or to the edge, margin or precipitous bank forming the ordinary normal high-water mark of such watercourses. High-water

mark of the lake shall be construed as the level of the top of the flush-boards on the State Dam on Owasco Outlet.

For the purpose of graduating the severity of the rules in their application to different parts of the watershed so as to conform to the varying degrees of danger to the water supply, the lake and its drainage area are divided into zones as bounded and described in the following schedule. The points and distances referred to in the descriptions and boundaries of the several zones, as given in the following schedule, shall be determined and interpreted by the city engineer of Auburn, from the topographical sheets of the United States Geographical Survey of the territory in question.

SCHEDULE I

Descriptions and boundaries of the Zones

Zone No. 1. Comprises the shores of the lake within a radius of two miles from the head of the outlet of the lake, together with all the drainage area tributary to the lake within the shore lines of this zone.

Zone No. 2. Comprises the shores of the lake outside of a radius of two miles and within a radius of six miles from the head of the outlet of the lake, together with all the drainage area tributary to the lake within the shore lines included in this zone.

Zone No. 3. Comprises all the remaining shores of the lake outside of Zones No. 1 and No. 2, together with all drainage area tributary to the lake within such shore lines, except that portion of the drainage area of Owasco inlet tributary to that stream above the point where it crosses the town line between the towns of Moravia and Locke, about one mile south of the village of Moravia.

Zone No. 4. Comprises that portion of the drainage area of Owasco inlet tributary to that stream above the point where it crosses the town lines between the towns of Moravia and Locke, about one mile south of the village of Moravia.

SCHEDULE OF LEAST PERMISSIBLE DISTANCES OF SOURCES OF POLLUTION FROM THE LAKE AND WATER-COURSES.

The several sources of pollution existing throughout the four zones and specified in the following rules shall not be placed.

maintained or allowed to remain within the following prohibited distances from the lake or any water-courses. This schedule is intended to form a part of the regulations and to have the same force as though the prescribed limiting distances were inserted in the several rules respectively.

SCHEDULE II.

Sources of Pollution as Specified in the Several Rules.		Least Permissible Distances from the Lake and Watercourses			
		Zone No. 1.	Zone No. 2.	Zone No. 3.	Zone No. 4.
		Feet.	Feet.	Feet.	Feet.
Rule (1)	Privies, etc., of any kind	60	40	20	10
Rule (2)	Privies, etc., for permanent storage or deposit or without watertight receptacles	150	100	60	25
Rule (5)	Burying human excreta, etc	250	200	140	80
Rule (7)	House slops, sewage, bath water, etc	200	150	80	30
Rule (8)	Garbage, sink waste, wash water, etc	80	40	......	....
Rule (10)	Stable, barnyard, hogpen, etc	60	35	20	10
Rule (11)	Spreading compost containing human excreta	250	200	140	80
Rule (11)	Spreading manure on land	75	30	......	....
Rule (12)	Vegetable waste	75	30	......	....
Rule (13)	Dead animals, offal, etc	100	75	40	10

RULES AND REGULATIONS

Privies Adjacent to the Lake and to Water-Courses

Rule 1. No privy, privy vault, pit, cesspool or any other receptacle of any kind or place used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained or allowed to remain within the prohibited distance from the lake or any water-course as prescribed for this rule by Schedule II for the different zones.

Rule 2. No privy, privy vault, pit, cesspool or any other receptacle of any kind or place for the permanent deposit of human excreta shall be constructed, placed, maintained or allowed to remain within the prohibited distance from the lake or any water-course as prescribed for this rule by Schedule II for the different zones.

Rule 3. Every privy, privy vault, pit, cesspool or other receptacle of any kind or place used for the temporary storage of human excreta which is constructed, placed, maintained or al-

lowed to remain within the limiting distance prescribed by Schedule II for the permanent constructions or places prohibited by Rule 2, from which privy or other receptacle the excreta are not at once removed automatically through suitable water-tight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable movable receptacles which shall at all times be maintained in an absolutely watertight condition and which will permit of convenient removal to some suitable place of ultimate disposal as hereinafter set forth.

Rule 4. The excreta collected in the aforesaid permissible temporary receptacles shall be removed and the receptacles thoroughly cleansed and deodorized as often as may be found necessary to maintain the privy in a proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundations or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape in being transferred from the privy to the place of disposal hereinafter specified, and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to the occupants of the premises and of the adjacent premises.

Rule 5. Unless otherwise specifically ordered or permitted in writing by the State Commissioner of Health, the excreta collected in the aforesaid receptacles shall, when removed, be disposed of by burying in trenches, or by thoroughly digging into the soil in such place and manner as to effectually prevent them being washed over the surface of the ground by rain or melting snow, and at distances from the lake or from any watercourse not less than those specified for this rule by Schedule II for the different zones.

Rule 6. Whenever it shall be found that, owing to the character of the soil or of the surface of the ground, or owing to the height or flow of the subsoil or surface water, or owing to any other special local conditions, the excremental matter from any privy or aforesaid receptacle, or from any trench or place of disposal may, in the opinion of the State Commissioner of Health, be washed over the surface or through the soil in an imperfectly

purified condition into the lake or any watercourse, then the said privy or receptacle for excrementa, or the said trench or place of disposal shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, Etc.

Rule 7. No house slops, bath water, sewage, or excremental matter from any watercloset, privy, or cesspool, shall be thrown, placed, led, conducted, or discharged or allowed to escape or flow from any pipe, drain or ditch, into the lake or into any watercourse, nor shall any such matter be thrown, placed, led, conducted, or discharged or allowed to escape or flow onto the surface of the ground or into the ground below the surface within the prohibited distance from the lake or any watercourse prescribed for this rule by schedule II for the different zones.

Rule 8. No garbage, putrescible matter, kitchen or sink waste, refuse or waste matter from any creamery, cheese factory, laundry, nor water in which milk cans, utensils, clothes, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind, shall be thrown or discharged directly or indirectly into the lake or any watercourse; nor shall any such liquid or solid refuse or waste matter be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground below the surface in any manner whereby the same may flow into the lake or into any water course within the prohibited distance prescribed for this rule by schedule II for the different zones.

Rule 9. No clothing, bedding, carpets, harness, vehicle, receptacle, utensil, nor anything that in any way or to any degree pollutes water shall be washed, rinsed or placed in the lake or in any watercourse within the limits of Zones No. 1 and No. 2.

Animals, Manure, Compost, Etc.

Rule 10. No stable for cattle or horses, barnyard, hogpen, poultry-house or yard, hitching post or standing place for horses or other animals, manure pile nor compost heap shall be con-

structed, placed, maintained or allowed to remain within the prohibited distance from the lake or from any watercourse prescribed for this rule by Schedule II for the different zones; and none of the above-named objects or sources of pollution shall be constructed, placed, maintained or allowed to remain where, or in such manner that the drainage, leachings or washings therefrom may enter the lake or any watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance not less than the prohibited distance from the lake or any water-course prescribed for this rule by Schedule II for the different zones.

Rule 11. No human excreta or compost containing the same shall be thrown, placed, discharged or allowed to escape or to pass into the lake or any water-course, nor to be placed, piled or spread upon the ground, or buried or dug into the soil, within the prohibited distance from the lake or any water-course prescribed for this portion of this rule by Schedule II for the different zones; and no manure or compost of any kind shall be thrown, placed, discharged, or allowed to escape or to pass into the lake or any water-course, nor be placed, piled or spread upon the ground, or buried or dug into the soil, within the prohibited distance from the lake or any water-course prescribed for this portion of this rule by Schedule II for the different zones.

Rule 12. No decayed or fermented fruit or vegetables, cider mill waste, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged or allowed to escape or to pass into the lake or any water-course, nor shall be thrown, placed, maintained or allowed to remain in such places that the drainage, leachings or washings therefrom may flow by open, blind or covered drains or channels of any kind into the lake or any watercourse, nor may any such material or the drainage, leachings or washings therefrom percolate through the ground to the lake or any water-course, without first having passed over or through such an extent of soil as to have become properly purified, and in no

case shall it be deemed that sufficient purification has been secured unless the above-mentioned drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for the distances prescribed for this rule by Schedule II for the different zones.

Dead Animals, Offal, Manufacturing Waste, Etc.

Rule 13. No dead animal, bird, fish, nor any part thereof, nor any offal nor refuse from any slaughter-house, nor any decomposed or putrescible refuse or waste matter of any kind shall be thrown, placed, discharged or allowed to escape or to pass into the lake or any water-course, nor shall any such material or refuse be so placed, maintained or allowed to remain that the drainage, leachings or washings therefrom may reach the lake or any water-course without first having percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for the distances prescribed for this rule by Schedule II for the different zones.

Refuse from Boats

Rule 14. No excreta, garbage, slops nor any decomposable or putrescible matter of any kind shall be thrown, discharged or allowed to escape or to pass into the lake from any steamer, barge, launch, sailboat, or rowboat. Steamers, barges and other boats having water-closet or toilet accommodations shall be provided with removable, water-tight receptacles, which shall be regularly emptied, cleaned and deodorized at least once each day, under the same restrictions as those which are imposed by Rules Nos. 4, 5 and 6.

Inspections

Rule 15. The water department of the city of Auburn shall maintain systematic and thorough inspections of the lake, boats used on or navigating the same, the lake shores and the entire drainage area of the lake, for the purpose of determining whether

the above-mentioned rules are complied with. At least two such inspections shall be made each year, and such others as may be directed by the State Commissioner of Health. A full and detailed report of each such inspection shall be submitted in writing to the State Commissioner of Health, and a duplicate copy of each such report shall be furnished the board of health of the city of Auburn.

Penalty

Rule 16. In accordance with section seventy (70) of chapter six hundred and sixty-one (661), as finally amended by chapter four hundred and eighty-four (484) of the Laws of 1904, the penalty for each and every violation of, or noncompliance with, any of the above rules and regulations which relate to a permanent source or act of contamination is hereby fixed at one hundred dollars ($100).

The foregoing rules and regulations for the protection from contamination of the public water supply of the city of Auburn, N. Y., were duly made, ordained and established on the 19th day of March, 1906, pursuant to chapter six hundred and sixty-one (661) of the Laws of the State of New York for 1893, as finally amended by chapter four hundred and eighty-four (484) of the Laws of 1904.

EUGENE H. PORTER,
State Commissioner of Health

These rules and regulations, to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Cayuga, Tompkins and Onondaga counties, N. Y., and in each county the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the water department of the city of Auburn, N. Y.

Chester

Rules and regulations for the protection from contamination of the public water supply of the village of Chester, N. Y., enacted by the New York State Commissioner of Health, under chapter 661 *of the Laws of* 1893, *as finally amended by chapter* 484 *of the Laws of* 1904.

GENERAL REGULATIONS

The rules and regulations hereinafter given, duly made and enacted in accordance with the provisions of sections 70, 71 and 72 of the Public Health Law, heretofore set forth, shall apply to Walton lake and to its entire drainage area situated in Orange county and forming the source of public water supply of the village of Chester, N. Y.

The term "reservoir," wherever used in these rules, is intended to mean and refer to Walton lake. The term "water-course," wherever used in these rules, is intended to mean and include every spring, pond, lake (other than Walton lake), stream, ditch, gutter, or other channel or permeable pipe or conduit of every kind, the waters of which when running, whether continuously or occasionally, eventually flow, or may flow, into Walton lake.

Whenever a linear distance of a structure or object from the reservoir or from a water-course is mentioned in these rules, it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the high-water mark of the reservoir, or the edge, margin or precipitous bank forming the ordinary high-water mark of such water-course.

Privies Adjacent to the Reservoir or Water-Courses

Rule 1. No privy, privy vault, pit, cesspool or any other receptacle of any kind used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, or maintained with its nearest point within fifty (50) feet of the reservoir or of any water-course of the Chester water supply.

Rule 2. No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta shall be constructed, located, placed or maintained with its nearest point within one hundred and fifty (150) feet of the reservoir or of any water-course of the Chester water supply.

Sewage, House Slops, Sink Waste, Etc.

Rule 3. No sewage nor excremental matter from any water-closet, privy or cesspool shall be led, conducted or discharged by any pipe, drain or ditch into the reservoir or any water-course of the Chester water supply, nor shall any such matter be placed, led, discharged or allowed to escape onto the surface of the ground or into the ground below the surface within two hundred (200) feet of the reservoir or of any water-course of the Chester water supply.

Rule 4. No garbage, putrescible matter, house slops, bath water, kitchen or sink waste, refuse or waste water from creameries, cheese factories, laundries, nor water in which milk cans, utensils, clothing, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged, directly or indirectly, into the reservoir or into any water-course of the Chester water supply; nor shall any such liquid or solid refuse or waste be thrown or discharged upon the surface of the ground or into the ground below the surface in any manner whereby the same may flow into the reservoir or into any water-course of the Chester water supply within one hundred (100) feet of the reservoir or within seventy-five (75) feet of any water-course of the Chester water supply.

Rule 5. No clothing, bedding, carpets, harness, vehicle, receptacles, utensils, nor anything that pollutes water shall be washed, rinsed or placed in the reservoir or in any water-course of the Chester water supply.

Bathing, Animals, Manure, Compost, Etc.

Rule 6. No person shall be allowed to bathe in the reservoir or in any water-course of the Chester water supply.

Rule 7. No stable for cattle or horses, barnyard, hogyard, pig-pen, poultry-house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap shall be located, placed, maintained or allowed to remain with its nearest point less than one hundred and fifty (150) feet from the reservoir, or less than seventy-five (75) feet from any water-course of the Chester water supply; and none of the above-named objects or

sources of pollution shall be so located, placed, maintained or allowed to remain that the drainage, leachings or washings from the same may enter the reservoir or any water-course of the Chester water supply, without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred and fifty (150) feet before entering the reservoir, nor less than seventy-five (75) feet before entering any water-course of the Chester water supply.

Rule 8. No human excrement or compost containing human excrement shall be placed, piled or spread upon the ground, or dug or buried in the soil, within a distance of three hundred (300) feet from the reservoir or two hundred (200) feet from any water-course of the Chester water supply; and no manure or compost of any kind shall be placed, piled or spread upon the ground within one hundred fifty (150) feet of the reservoir or seventy-five (75) feet of any watershed of the Chester water supply.

Rule 9. No decayed or fermented fruit or vegetables, cider mill waste, roots, grain, or other vegetable refuse of any kind shall be located, placed, maintained or allowed to remain in such places that the drainage, leachings or washings therefrom may flow by open, blind or covered drains or channels of any kind into the reservoir or any water-course of the Chester water supply, without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above mentioned drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred (100) feet before entering the reservoir, or fifty (50) feet before entering any water course of the Chester water supply.

Dead Animals, Offal, Manufacturing Waste, Etc.

Rule 10. No dead animal, bird, fish, or any part thereof, nor any offal nor waste matter of any kind, shall be thrown, placed in,

or allowed to pass into the reservoir or any water course of the Chester water supply; nor shall any such material or refuse be so located, placed, maintained, or allowed to remain that the drainage, leachings or washings therefrom may reach the reservoir or water course without first having percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred fifty (150) feet before entering the reservoir, or one hundred (100) feet before entering any water course of the Chester water supply.

Fishing and Boating

Rule 11. No person while fishing or boating shall commit any act by which the waters of the Chester water supply may be polluted.

Inspection

Rule 12. The board of water commissioners, or in the absence of such a board, the board of trustees, of the Village of Chester, shall maintain systematic and thorough inspections of the reservoir and of the entire drainage area tributary thereto, for the purpose of determining whether the above rules are being complied with. At least four such inspections shall be made each year, and such others as may be directed by the State Commissioner of Health. A full and detailed report of each such inspection, including a statement of each violation or non-compliance with the rules, shall be submitted in writing to the State Commissioner of Health within ten days after the completion of such inspection.

Penalty

Rule 13. An accordance with section seventy (70) of chapter six hundred and sixty-one (661) of the laws of 1893, as finally amended by chapter four hundred and eighty-four (484) of the laws of 1904, the penalty for each and every violation of, or non-compliance with, any of these rules and regulations which relate to a permanent source or act of contamination is hereby fixed at one hundred dollars ($100.)

The foregoing rules and regulations for the protection from contamination of the public water-supply of the Village of Chester, Orange county, N. Y., were duly made, ordained and established

on the 19th day of March, 1906, pursuant to chapter six hundred sixty-one (661) of the laws of the State of New York for 1893, as finally amended by chapter four hundred eighty-four (484) of the laws of 1904.

EUGENE H. PORTER,
State Commissioner of Health

Albany, N. Y.

The rules and regulations, to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Orange county, N. Y., and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the water department of the village of Chester, N. Y.

Hudson

Rules and regulations for the protection from contamination of the public water supply of the city of Hudson, N. Y., enacted by the State Commissioner of Health under chapter 661 *of the Laws of* 1893, *as finally amended by chapter* 582 *of the Laws of* 1906.

GENERAL REGULATIONS

Applicable to both Watersheds

Application. The rules and regulations hereinafter given, duly made and enacted in accordance with the provisions of sections 70, 71 and 72 of the Public Health Law heretofore set forth, shall apply to the entire drainage area of Taghkanic creek above the diversion intake dam of the public water system of the city of Hudson at New Forge in the town of Taghkanic, Columbia county, and also to the entire drainage area tributary to the reservoir of the public water system of the city of Hudson at Churchtown in the town of Claverack, Columbia county, both of which drainage areas are tributary to the public water supply of the city of Hudson.

Interpretation. The term "reservoir" wherever used in these rules is intended to mean the Churchtown reservoir. The term "water course" wherever used in these rules is intended to mean and include every spring, pond, lake (other than the Churchtown reservoir), stream, ditch, gutter, or other channel or permeable pipe or conduit of every kind, the waters of which when running, whether continuously or occasionally, eventually flow, or may flow, into the diversion pond at New Forge on Taghkanic creek or into the Churchtown reservoir, respectively.

Wherever a linear distance of a structure or object from the reservoir or from a water course is mentioned in these rules it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the high-water mark of the reservoir or of any lake or pond, or to the edge, margin or precipitous bank forming the ordinary normal high-water mark of any such water course.

Inspections and Examinations. The water department of the city of Hudson shall maintain systematic and thorough inspections of the reservoir, the diversion pond at New Forge and the entire drainage area tributary to each, for the purpose of determining whether the following rules are being complied with. At least two such inspections shall be made each year, and such others as may be directed by the State Commissioner of Health. A full and detailed report of each such inspection shall be submitted in writing by the Water Department of the city of Hudson to the State Commissioner of Health and local board of health, within ten days after the completion of the same.

The water department of the city of Hudson shall cause to be made, by a competent water bacteriologist, monthly bacteriological examinations of both the raw, unfiltered water and the filtered water at the filters of the Hudson water department, and a copy of each such examination shall be forwarded to the State Commissioner of Health and local board of health.

Penalty. In accordance with section seventy (70) of chapter six hundred and sixty-one (661) of the laws of 1893, as finally amended by chapter four hundred and eighty-four (484) of the laws of 1904, the penalty for each and every violation of, or non-compliance with, any of these rules and regulations which

relate to a permanent source or act of contamination, is hereby fixed at one hundred dollars ($100).

SPECIAL REGULATIONS RELATING TO THE TWO SEPARATE DRAINAGE AREAS RESPECTIVELY

Taghkanic Creek Drainage Area

The following rules and regulations are intended to apply to the entire drainage area of the Taghkanic creek above the diversion dam of the Hudson public water supply at New Forge.

Privies Adjacent to Taghkanic Creek and Watercourses Tributary Thereto

Rule 1. No privy, privy vault, pit, cesspool or any other receptacle of any kind or place used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained, or allowed to remain within twenty-five (25) feet from any watercourse tributary to the Hudson public water-supply diversion pond at New Forge.

Rule 2. No privy, privy vault, pit, cesspool or any other receptacle of any kind or place for the permanent deposit of human excreta shall be constructed, placed, maintained or allowed to remain within fifty (50) feet from any watercourse tributary to the Hudson public water-supply diversion pond at New Forge.

Rule 3. Every privy, privy vault, pit, cesspool or other receptacle of any kind or place used for the temporary storage of human excreta which is constructed, placed, maintained or allowed to remain within fifty (50) feet from any watercourse tributary to the Hudson public water-supply diversion pond at New Forge, from which privy or other receptacle the excreta are not at once removed automatically through suitable water-tight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable movable receptacles which shall at all times be maintained in an absolutely water-tight condition and which will permit of convenient removal to some suitable place of ultimate disposal as hereinafter set forth.

Rule 4. The excreta collected in the aforesaid permissible temporary receptacles shall be removed and the receptacles thoroughly cleansed and deodorized as often as may be found necessary to maintain the privy in a proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundations or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape in being transferred from the privy to the place of disposal hereinafter specified and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to the occupants of the premises and of adjacent premises.

Rule 5. Unless otherwise specifically ordered or permitted in writing by the State Commissioner of Health the excreta collected in the aforesaid receptacles shall, when removed, be disposed of by burying in trenches or by thoroughly digging into the soil in such place and manner as to effectually prevent them being washed over the surface of the ground by rain or melting snow, and at a distance of not less than one hundred and fifty (150) feet from any watercourse tributary to the Hudson public water-supply diversion pond at New Forge.

Rule 6. Whenever it shall be found that, owing to the character of the soil or of the surface of the ground, or owing to the height or flow of subsoil or surface water, or owing to other special local conditions, the excremental matter from any privy or aforesaid receptacle, or from any trench or place of disposal may, in the opinion of the State Commissioner of Health, be washed over the surface or through the soil in an imperfectly purified condition into any watercourse tributary to the Hudson public water-supply diversion pond at New Forge, then the said privy or receptacle for excrementa, or the said trench or place of disposal shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, Etc.

Rule 7. No house slops, bath water, sewage or excremental matter from any watercloset, privy or cesspool, shall be thrown,

placed, led, conducted or discharged or allowed to escape or flow from any pipe, drain or ditch, into any watercourse tributary to the Hudson public water-supply diversion pond at New Forge; nor shall any such matter be thrown, placed, led, conducted or discharged or allowed to escape or flow onto the surface of the ground or into the ground below the surface within fifty (50) feet from such watercourse.

Rule 8. No garbage, putrescrible matter, kitchen or sink waste, refuse or waste water from any creamery, cheese factory, laundry, nor water in which milk cans, utensils, clothes, bedding, carpets or harnesses have been washed or rinsed nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any watercourse tributary to the Hudson public water-supply diversion pond at New Forge; nor shall any such liquid or solid refuse or waste matter be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into the ground within twenty-five (25) feet of any such watercourse.

Rule 9. No stable for cattle or horses, barn-yard, hog-pen, poultry house or yard, hitching post or standing place for horses or other animals, manure pile nor compost heap shall be constructed, placed, maintained or allowed to remain within twenty-five (25) feet of any watercourse tributary to the Hudson public water-supply diversion pond at New Forge; and none of the above named objects or sources of pollution shall be constructed, placed, maintained or allowed to remain where, or in such manner that, the drainage, leachings or washings therefrom may enter any such watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance not less than twenty-five (25) feet from any such watercourse.

Rule 10. No human excreta or compost containing the same shall be thrown, placed, discharged, or allowed to escape or to pass into any watercourse tributary to the Hudson public water-supply

diversion pond at New Forge, nor to be placed, piled or spread upon the ground, or buried or dug into the soil, within one hundred (100) feet from any such watercourse.

Dead Animals, Offal, Manufacturing Waste, Etc.

Rule 11. No dead animal, bird, fish, nor any part thereof, nor any offal nor refuse from any slaughter-house, nor any decomposed or putrescible refuse or waste matter of any kind shall be thrown, placed, discharged or allowed to escape or to pass into into any water course tributary to the Hudson public water-supply diversion pond at New Forge; nor shall any such material or refuse be so placed, maintained or allowed to remain that the drainage, leachings or washings thereform may reach any such watercourse without first having percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of fifty (50) feet from any such watercourse.

The Churchtown Reservoir Drainage Area

The following rules and regulations relate to the entire drainage area tributary to the Churchtown reservoir of the Hudson public water supply.

Privies Adjacent to the Churchtown Reservoir and Its Watercourses

Rule 12. No privy, privy vault, pit, cesspool or any other receptacle of any kind or place used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained, or allowed to remain within one hundred feet of the Churchtown reservoir course entering the same.

Rule 13. No privy, privy vault, pit, cesspool or any other receptacle of any kind or place for the permanent deposit of human excreta shall be constructed, placed or maintained or allowed to remain within two hundred feet of the Churchtown reservoir or within one hundred feet of any watercourse entering the same.

Rule 14. Every privy, privy vault, pit, cesspool or other receptacle of any kind or place used for the temporary storage of human excreta which is constructed, placed, maintained or allowed to remain within two hundred (200) feet of the Churchtown reservoir or within one hundred (100) feet of any watercourse entering the same, from which privy or other receptacle the excreta are not at once removed automatically through suitable water-tight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable movable receptacles which shall at all times be maintained in an absolutely water-tight condition and which will permit of convenient removal to some suitable place of ultimate disposal as hereinafter set forth.

Rule 15. The excreta collected in the aforesaid permissible temporary receptacles shall be removed and the receptacles thoroughly cleansed and deodorized as often as may be found necessary to maintain the privy in a proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundations or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape in being transferred from the privy to the place of disposal hereinafter specified and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to the occupants of the premises and of adjacent premises.

Rule 16. Unless otherwise specifically ordered or permitted in writing by the State Commissioner of Health, the excreta collected in the aforesaid receptacles shall, when removed, be disposed of by burying in trenches or by thoroughly digging into the soil in such place and manner as to effectually prevent them being washed over the surface of the ground by rain or melting snow, and at a distance of not less than three hundred (300) feet from the Churchtown reservoir or two hundred (200) feet from any watercourse entering the same.

Rule 17. Whenever it shall be found that, owing to the character of the soil or of the surface of the ground, or owing to the

height or flow of subsoil or surface water or flowing to other special local conditions, the excremental matter from any privy or aforesaid receptacle, or from any trench or place of disposal may, in the opinion of the State Commissioner of Health, be washed over the surface or through the soil in an imperfectly purified condition into the reservoir or any watercourse entering the same, then the said privy or receptacle for excrementa, or the said trench or place of disposal shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, Etc.

Rule 18. No house slops, bath water, sewage or excremental matter from any watercloset, privy or cesspool, shall be thrown, placed, led, conducted, or discharged or allowed to escape or flow from any pipe, drain or ditch, into the reservoir or any watercourse entering the same; nor shall any such matter be thrown, placed, led, conducted or discharged or allowed to escape or flow onto the surface of the ground or into the ground below the surface within one hundred and fifty (150) feet of the Churchtown reservoir or within one hundred (100) feet of any watercourse entering the same.

Rule 19. No garbage, putrescible matter, kitchen or sink waste, refuse or waste water from any creamery, cheese factory, laundry, nor water in which milk cans, utensils, clothes, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into the reservoir or any water-course entering the same; nor shall any such liquid or solid refuse or waste matter be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground within one hundred (100) feet of the Churchtown reservoir or within seventy-five (75) feet of any watercourse entering the same.

Rule 20. No clothing, bedding, carpets, harness, vehicle, receptacle, utensil, nor anything that in any way or to any degree pollutes water shall be washed, rinsed or placed in the reservoir

or in any watercourse tributary thereto within a distance of one mile from the reservoir as the stream flows.

Bathing, Animals, Manure, Compost, Etc.

Rule 21. No person shall be allowed to bathe in the reservoir or in any watercourse tributary thereto within a distance of one mile from the reservoir as the stream flows; nor shall any animals or poultry be allowed to stand, wade, swim in, or to be washed in the reservoir; nor shall boating or fishing be allowed on the reservoir.

Rule 22. No stable for cattle or horses, barn-yard, hog-pen, poultry house or yard, hitching-post or standing place for horses or other animals, manure pile nor compost heap shall be constructed, placed, maintained or allowed to remain within sixty (60) feet of the Churchtown reservoir or within forty (40) feet of any watercourse entering the same; and none of the above named objects or sources of pollution shall be constructed, placed, maintained or allowed to remain where, or in such manner that, the drainage, leachings or washings therefrom may enter the reservoir or any watercourse tributary thereto without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than sixty (60) feet from the reservoir or forty (40) feet from any watercourse entering the same.

Rule 23. No human excreta or compost containing the same shall be thrown, placed, discharged, or allowed to escape or to pass into the reservoir or any watercourse tributary thereto, nor to be placed, piled or spread upon the ground, or buried or dug into the soil, within three hundred (300) feet of the Churchtown reservoir or within two hundred (200) feet of any watercourse entering the same; and no manure or compost of any kind shall be thrown, placed, discharged or allowed to escape or to pass into the reservoir or any watercourse tributary thereto, nor be placed, piled or spread upon the ground, or buried or dug into the soil,

height or flow of subsoil or surface water or flowing to other special local conditions, the excremental matter from any privy or aforesaid receptacle, or from any trench or place of disposal may, in the opinion of the State Commissioner of Health, be washed over the surface or through the soil in an imperfectly purified condition into the reservoir or any watercourse entering the same, then the said privy or receptacle for excrementa, or the said trench or place of disposal shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, Etc.

Rule 18. No house slops, bath water, sewage or excremental matter from any watercloset, privy or cesspool, shall be thrown, placed, led, conducted, or discharged or allowed to escape or flow from any pipe, drain or ditch, into the reservoir or any watercourse entering the same; nor shall any such matter be thrown, placed, led, conducted or discharged or allowed to escape or flow onto the surface of the ground or into the ground below the surface within one hundred and fifty (150) feet of the Churchtown reservoir or within one hundred (100) feet of any watercourse entering the same.

Rule 19. No garbage, putrescible matter, kitchen or sink waste, refuse or waste water from any creamery, cheese factory, laundry, nor water in which milk cans, utensils, clothes, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into the reservoir or any water-course entering the same; nor shall any such liquid or solid refuse or waste matter be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground within one hundred (100) feet of the Churchtown reservoir or within seventy-five (75) feet of any watercourse entering the same.

Rule 20. No clothing, bedding, carpets, harness, vehicle, receptacle, utensil, nor anything that in any way or to any degree pollutes water shall be washed, rinsed or placed in the reservoir

of August, 1906, pursuant to chapter six hundred and sixty-one (661) of the Laws of the State of New York for 1893, as finally amended by chapter five hundred and eighty-two (582) of the Laws of 1906.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Columbia county, N. Y., and the affidavits of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the County Clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the water department of the city of Hudson, N. Y.

PENN YAN

Rules and regulations for the protection from contamination of the public water supply of the village of Penn Yan, Yates county, N. Y.

SPECIAL REGULATIONS

Privies Adjacent to Keuka Lake and To Watercourses Tributary Thereto.

Rule 1. No privy or place for the deposit or storage of human excreta shall be constructed, located or maintained within twenty-five feet horizontal measurement, of the highwater mark or precipitous bank of Keuka Lake or of any spring, stream, ditch or watercourse of any kind, the water of which, when running, flows eventually into Keuka Lake.

Rule 2. No privy vault, pit or cesspool, or non-transportable receptacle of any kind for the reception or storage of human excreta shall be constructed, located or maintained within 125 feet, horizontal measurement of the highwater mark or precipitous bank of Keuka Lake or of any spring, stream, ditch or watercourse of any kind, the water of which, when running, flows eventually into Keuka Lake.

within seventy-five (75) feet of the reservoir or within fifty (50) feet of any watercourse entering the same.

Rule 24. No decayed or fermented fruit or vegetables, cider mill waste, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged or allowed to escape or to pass into the reservoir or any watercourse tributary thereto, nor shall be thrown, placed, maintained or allowed to remain in such places that the drainage, leachings, or washings therefrom may flow by open, blind or covered drains or channels of any kind into the reservoir or any watercourse tributary thereto, nor may any such material or the drainage, leachings or washings therefrom percolate through the ground to the reservoir or any watercourse tributary thereto, without first having passed over or through such an extent of soil as to have become properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above mentioned drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of sixty (60) feet from the Churchtown reservoir or forty (40) feet from any watercourse entering the same.

Dead Animals, Offal, Manufacturing Waste, Etc.

Rule 25. No dead animal, bird, fish, nor any part thereof, nor any offal nor refuse from any slaughter-house, nor any decomposed or putrescible refuse or waste matter of any kind shall be thrown, placed, discharged or allowed to escape or to pass into the reservoir or any watercourse tributary thereto; nor shall any such material or refuse be so placed, maintained or allowed to remain that the drainage, leachings or washings therefrom may reach the reservoir or any watercourse tributary thereto without first having percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of one hundred and fifty (150) feet from the Churchtown reservoir or one hundred (100) feet from any watercourse entering the same.

The foregoing rules and regulations for the protection from contamination of the public water supply of the city of Hudson, N. Y., were duly made, ordained and established on the 8th day

of August, 1906, pursuant to chapter six hundred and sixty-one (661) of the Laws of the State of New York for 1893, as finally amended by chapter five hundred and eighty-two (582) of the Laws of 1906.

EUGENE H. PORTER,
State Commissioner of Health

Albany, N. Y.

These rules and regulations to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Columbia county, N. Y., and the affidavits of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the County Clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the water department of the city of Hudson, N. Y.

Penn Yan

Rules and regulations for the protection from contamination of the public water supply of the village of Penn Yan, Yates county, N. Y.

SPECIAL REGULATIONS

Privies Adjacent to Keuka Lake and To Watercourses Tributary Thereto.

Rule 1. No privy or place for the deposit or storage of human excreta shall be constructed, located or maintained within twenty-five feet horizontal measurement, of the highwater mark or precipitous bank of Keuka Lake or of any spring, stream, ditch or watercourse of any kind, the water of which, when running, flows eventually into Keuka Lake.

Rule 2. No privy vault, pit or cesspool, or non-transportable receptacle of any kind for the reception or storage of human excreta shall be constructed, located or maintained within 125 feet, horizontal measurement of the highwater mark or precipitous bank of Keuka Lake or of any spring, stream, ditch or watercourse of any kind, the water of which, when running, flows eventually into Keuka Lake.

Rule 3. Every privy or place for the deposit of human excreta which is constructed, located or maintained between the aforesaid limits of 25 to 125 feet, horizontal measurement, of the high-water mark or precipitous bank of Keuka Lake or of any spring, stream, ditch or watercourse as aforesaid and from which the said excrement is not at once removed automatically by means of suitable water-tight pipes or conduits to some proper place of disposal beyond the maximum aforesaid limit, shall be arranged in such a manner that all said excreta shall be received and temporarily retained in suitable vessels or receptacles which shall at all times be maintained in an absolutely water-tight condition and which will admit of convenient removal to some place of ultimate disposal beyond the said maximum limits.

Rule 4. The excreta collected in the aforesaid removable receptacles shall be removed, and the receptacles cleansed and deodorized as often as is necessary to keep the receptacles in proper sanitary condition, and to prevent an overflow of the excreta upon the soil or the floor of said privy.

Rule 5. The excreta so collected shall be so removed as to cause the least nuisance possible, and shall be so disposed of that they cannot be washed either over the surface of the ground or through the subsoil into Keuka Lake or into any spring, stream, ditch, or watercourse of any kind as aforesaid, and shall be so placed as not to cause an offensive nuisance.

Rule 6. Whenever it shall be found that, owing to the porous character of the soil, the height and flow of surface and subsoil waters, the steepness of the slopes, or other special conditions of the locality, the excremental matter from any privy, cesspool, or other receptacle for human excreta may be washed over the surface or through the subsoil into Keuka Lake or into any spring, stream, ditch, or watercourse as aforesaid, without having been thereby, in the judgment of the State Department of Health, sufficiently purified, then the said privy, cesspool, or other receptacle for human excreta shall, after due notice to the owner thereof, be removed to such greater distance from said highwater marks as shall be considered safe and proper by the said department of health.

House Slops, Sink Wastes, Laundry Water, and Other Similar Liquid Wastes.

Rule 7. No sewage, house slops, sink wastes, water in which clothes or bedding have been washed or rinsed, nor any other polluted water or liquid shall be thrown or discharged directly or through pipes into that part of Keuka Lake, within a distance of three miles from the water works intake, or any spring, stream, ditch, or watercourse draining into part. Nor shall any liquid or solid matter or other polluted liquid be thrown or discharged upon the surface of the ground or into the ground below the surface in any manner whereby the same may flow directly or indirectly into Keuka Lake or into any spring, stream, ditch, or watercourse aforesaid, without first passing over or through the soil in such a way as shall, in the judgment of the State Department of Health, serve to remove the dangerous elements of said polluted liquid.

Rule 8. No sewage, house slops, sink waste, water in which clothes or bedding have been washed or rinsed, nor any other polluted water or liquid shall be thrown or discharged directly or through pipes, into that part of Keuka Lake beyond a distance of three miles from the water works intake, or from any spring, stream, ditch, or watercourse draining into that part, without first passing through a chamber or tank wherein the solids in suspension in the polluted liquid shall be at least partially removed. A tank or chamber used for this purpose shall have a volume below water level of at least five cubic feet for every person contributing sewage or liquid wastes thereto.

Rule 9. No clothing, animals, vehicles, nor anything which pollutes water shall be washed in Keuka Lake or in any spring, stream, ditch or watercourse as aforesaid, nor shall the washwater from clothing, animals, vehicles, or from other things causing pollution, be allowed to run directly into Keuka Lake or any spring, stream, ditch, or watercourse as aforesaid, but shall flow over the soil or in shallow earth ditches for a distance of at least one hundred (100) feet before entering said lake or watercourse.

Rule 10. No garbage or other putrescible refuse of any kind shall be thrown or discharged directly into Keuka Lake or into any spring, stream, ditch or watercourse aforesaid, nor shall any

such substances be placed upon or below the surface of the ground where they may be washed into Keuka Lake, or into any spring, stream, ditch, or watercourse aforesaid, unless at least 200 feet from the highwater mark or precipitous bank thereof.

Manures, Compost and Similar Matter

Rule 11. No stable, pigsty, henhouse, barnyard, hogpen, duck-yard, hitching or standing place for horses or cattle, or other place where animal manure accumulates, and compost or manure heaps, shall be located or maintained within 100 feet of, nor shall they, or any watering place for horses, cattle or other animals, be so arranged that the polluted drainings therefrom, shall flow directly into or through open or covered drains into Keuka Lake or into any spring, stream, ditch, or watercourse aforesaid, but all such drainage shall be made to flow over the soil or in shallow earth ditches for a distance of at least 100 feet as above indicated.

Rule 12. No human excreta or compost containing human excreta shall be spread upon the ground within 500 feet of the highwater mark or precipitous bank of Keuka Lake within a distance of three miles of the waterworks intake, nor within two hundred (200) feet of any other part of the lake or any spring, stream, ditch, or watercourse aforesaid, and then only provided that the average surface slope does not exceed 5 in 100 from the place of deposit to highwater mark; and no manures or compost of any kind shall be deposited so as to be washed a less distance than 100 feet, over the surface or through the subsoil into Keuka Lake or any spring, stream, ditch, or watercourse aforesaid, without first having undergone proper purification.

Dead Animals, Refuse and Manufacturing Wastes

Rule 13. No dead animal, bird, fish, nor any part thereof, nor any filthy or impure matter, nor any decayed fruit or vegetable substance, nor any waste products, putrescible matter or polluted waters from any slaughter house, dairy, creamery, cider-mill, sawmill or other manufactory, shall be thrown or allowed to run into Keuka Lake or any spring, stream, ditch or watercourse aforesaid, nor shall they be so deposited that any portion thereof or of the polluted drainage therefrom shall be washed on

the surface for less than 100 feet into Keuka Lake or any spring, stream, ditch or watercourse aforesaid.

Rule 14. No interment of a human body shall be made within 500 feet of the highwater mark or precipitous bank of Keuka Lake or of any spring, stream, ditch, or watercourse aforesaid.

Steamboats, House Boats and Yachts

Rule 15. No privies or closets used and maintained on steamboats, gasoline boats, house boats or yachts, whether flushed by water or not, shall discharge or empty directly into or over the waters of Keuka Lake. All such boats of every description whatever shall be provided with suitable galvanized iron buckets or receptacles which shall when full or when convenient be removed from the boat and emptied on or buried beneath the surface of the ground as provided in rule 12.

The foregoing rules and regulations for the protection from contamination of the public water supply of the village of Penn Yan, N. Y., were duly made, ordained and established on the 17th day of September, 1906, pursuant to chapter six hundred and sixty-one (661) of the Laws of the State of New York for 1893, as finally amended by chapter five hundred and eighty-two (582) of the Laws of 1906.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations, to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Yates County, N. Y., and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the water department of the village of Penn Yan, N. Y.

SARANAC LAKE

The rules and regulations hereinafter given, duly made in accordance with the provisions of sections 70, 71 and 72 of the Public Health Law, heretofore set forth, shall apply to the entire drainage area of McKenzie Lake or Pond, situated in the townships of St. Armand and North Elba, Essex county, which forms the source of the public water supply of the village of Saranac Lake, N. Y.

The term "lake" wherever used in these rules is intended to refer to McKenzie Lake or Pond. The term "watercourse" wherever used in these rules is intended to mean and include every spring, stream, ditch, gutter or other natural channel or permeable artificial pipe or conduit of every kind, the waters of which when running, whether continuously or occasionally, eventually flow, or may flow, into McKenzie Lake or Pond.

Wherever in these rules a linear distance of a structure or object from the lake or from a watercourse is mentioned it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the highwater mark of McKenzie Lake or Pond, or to the edge, margin or precipitous bank forming the ordinary normal highwater mark of such watercourses.

RULES AND REGULATIONS

Privies Adjacent to the Lake and Watercourses.

Rule 1. No water-closet, privy, privy vault, pit or cesspool, or other place or receptacle of any kind whatever used for the temporary or permanent deposit, reception or storage of human excreta shall be constructed, located, placed, maintained or allowed to remain within three hundred (300) feet of the lake, or within two hundred (200) feet of any watercourse.

Rule 2. No water-closet, privy, privy-vault, pit, cesspool, or other place or receptacle of any kind used for the temporary or permanent deposit, reception or storage of human excreta, other than the water-tight, removable receptacles hereinafter prescribed, shall be located, placed, maintained, or allowed to remain within six hundred (600) feet of the lake or of any watercourse.

Rule 3. Every water-closet, privy or place for the deposit, reception or storage of human excreta, which is constructed, located,

maintained or allowed to remain within the aforesaid six hundred (600) feet of the lake or of any watercourse shall be arranged in such manner that all of said excreta shall be received and temporarily retained in suitable vessels or receptacles, which shall at all times be maintained in an absolutely water-tight condition, and which will permit of convenient removal to some place of ultimate disposal as hereinafter set forth.

Rule 4. The excreta collected in the aforesaid removable receptacles shall be removed to the garbage lot of the village of Saranac Lake, N. Y., or other accessible and suitable place outside of the watershed of the said McKenzie Lake, and the receptacles emptied, cleansed and deodorized as often as may be found necessary to maintain the privy in thoroughly sanitary condition, and to effectually and strictly prevent any overflow whatever upon the soil or upon the foundation or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal herein specified, and that the least possible annoyance or inconvenience be caused to the occupants of the premises or of adjoining premises. The excreta removed shall be thoroughly buried and covered in trenches or thoroughly dug into the soil in such place and manner that no sanitary harm, annoyance or objection may result therefrom.

Rule 5. Whenever it shall be found that, owing to the character of the soil, or the surface of the ground, or to the height or flow of the subsoil or surface water, or other special local condition, the excretal matter from any privy or aforesaid receptacle may, in the opinion of the State Commissioner of Health, be washed over the surface of the ground or through the soil into the lake or into any watercourse, then the said privy or receptacle for excreta shall, after due notice to the owner, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, Offal, Garbage, Putrescible Matter, Etc.

Rule 6. No sewage or excremental matter of any kind, nor any compost or mixture containing the same shall be thrown, placed, led, conducted or discharged or allowed to escape or pass into the

lake or any watercourse nor onto or into the ground within six hundred (600) feet of the lake or any watercourse.

Rule 7. No offal, garbage or putrescible animal or vegetable matter of any kind, nor any bath-water, wash-water or other polluted water, or liquid shall be thrown, placed, led, conducted, discharged or allowed to escape or pass into the lake or into any watercourse; nor onto or into the ground within three hundred (300) feet from the lake or within two hundred (200) feet of any watercourse.

Rule 8. No clothing, bedding, carpet, harness, vehicle, utensil, nor anything that pollutes water shall be washed, rinsed or placed in the lake or in any watercourse.

Stables, Animals, Manure, Etc.

Rule 9. No stable, cattle pen, pigsty, hog lot, poultry house, poultry yard, barn yard, hitching place or standing place for horses or other animals, and no manure pile, compost heap, piles of fermented or decayed fruit, vegetables, roots, grain or other vegetable substances shall be located, placed, maintained or allowed to remain in such place, or manner that the washings or drainage therefrom may flow by open, blind or covered drains or channels of any kind into McKenzie Lake or into any pond, reservoir, spring, stream, ditch, gutter or watercourse aforesaid, without first having passed over or through the soil in a scattered dissipated form, and not concentrated in definite lines of flow, for a distance of at least three hundred (300) feet before entering the lake, or at least two hundred (200) feet before entering any watercourse, and in no case shall the distance of any of the above-named objects, places or material be less than three hundred (300) feet from the lake nor less than two hundred (200) feet from any watercourse.

Rule 10. No manure or compost of any kind shall be deposited or spread upon the ground so as to be washed in a scattered, dissipated form and not concentrated in definite lines of flow for a distance less than three hundred (300) feet before entering the lake, nor less than two hundred (200) feet before entering any watercourse.

Bathing, Boating, Camps and Cottages

Rule 11. No person shall wash, bathe or swim in the lake nor in any watercourse within one mile of its mouth at the lake.

Rule 12. No raft, boat, launch or other craft, shall be kept or used for any purpose on the lake, except that one row boat may be kept by the water department of the village of Saranac Lake, and used only for purposes necessary to the operation, use or maintenace of the lake as a source of water-supply to the village of Saranac Lake, and when not so used shall be so kept or fastened as not to be used for any other purpose nor by any other person than the one duly authorized by the said water department.

Rule 13. No person or persons shall erect, maintain, use or occupy any tent, camp, cottage or other structure on any State land within a distance of three hundred (300) feet from the shore of the lake or of any watercourse.

General Prohibition

Rule 14. All persons are hereby forbidden to pollute or defile by any means, or to be or become in any manner accessory to the pollution or the defiling by any means of the waters of said McKenzie Lake or any of its tributaries, either on or in the waters of the lake or any watercourse, or on the banks or adjacent land, in such manner as thereby to pollute the waters of the lake or any watercourse.

Inspections

Rule 15. The water department of the village of Saranac Lake shall maintain systematic and thorough inspections of the lake, its watercourses and its drainage area, for the purpose of determining whether the above rules are complied with. At least four such inspections shall be made each year, and such other and special inspections shall be made when directed by the State Commissioner of Health. Full and detailed reports of each such regular and special inspection shall be made in writing by the water department to the State Commissioner of Health within five days of the date of completion, and within ten days of the date of beginning each such inspection

Penalty

Rule 16. In accordance with the provisions of section seventy (70) of chapter six hundred sixty-one (661) of the Laws of 1893, as finally amended by chapter four hundred eighty-four (484) of the Laws of 1904, the penalty for each and every violation of, or noncompliance with, any of the above rules or regulations which relate to a permanent source or act of contamination, or to a permanent violation, is hereby fixed at one hundred ($100) dollars.

The foregoing rules and regulations for the protection from contamination of the public water supply of the village of Saranac Lake, N. Y., were duly made, ordained and established on the 14th day of February, 1906, pursuant to chapter six hundred and sixty-one (661) of the Laws of the State of New York for 1893, as finally amended by chapter four hundred and eighty-four (484) of the Laws of 1904.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Essex County, N. Y., and the affidavit of the printer, publisher or proprietor of each newspaper, in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the water department of the village of Saranac Lake, N. Y.

STAMFORD WATER CO.

Rules and regulations for the protection from contamination of the watershed of the Stamford Water Company within the State of New York.

Mill River and Its Tributaries

The rules and regulations hereinafter given, duly made and enacted in accordance with the provisions of sections 70, 71 and

72 of the Public Health Law heretofore set forth, shall apply to Trinity Lake, Mud Pond or Mead Pond, and to all those portions of Mill River, otherwise called Rippowan River, which are situated within the State of New York (Westchester county) lying above the reservoir and intake of the Stamford Water Company, as well as to every spring, stream, ditch, gutter, drain or watercourse of any kind, the waters of which when running eventually flow into Mud Pond, Trinity Lake or Mill River within the said State above such intake.

Penalties. In accordance with section 70 of chapter 661 of the Laws of 1893, as finally amended by chapter 484 of the Laws of 1904 the penalty of each and every violation of, or noncompliance with, any of these rules and regulations which relate to a permanent source or act of contamination, is hereby fixed at one hundred dollars ($100).

Privies Adjacent to Ponds, Lakes, Reservoirs or Watercourses

1. No privy, privy vault, pit, cesspool or any other receptacle of any kind used for the deposit, reception or storage of human excreta shall be constructed, located, placed or maintained with its nearest point within fifty (50) feet, horizontal measurement, of the highwater mark of any lake, pond or reservoir, or of the edge, margin or precipitous bank of any spring, stream, ditch, gutter, drain or other watercourse of any kind, the waters of which comprise, or when running, flow eventually into Trinity Lake, Mud Pond or Mill river, within the said State.

2. Every privy, privy vault, pit or cesspool or other receptacle or place used for the deposit, reception or storage of human excreta which is constructed, located or maintained within two hundred and fifty (250) feet, horizontal measurement, of the highwater mark of any lake, pond or reservoir, or of the edge, margin or precipitous bank of any spring, stream, ditch, gutter, drain or watercourse of any kind whose waters comprise or when running flow into Trinity Lake, Mud Pond or Mill river within the said State, and from which privy or other receptacle, the excreta are not at once removed automatically by means of suitable water-tight pipes or conduits to some proper place of ultimate disposal as hereinafter provided, shall be arranged in such man-

ner that all such excreta shall be received temporarily in suitable vessels or receptacles which shall at all times be maintained in an absolutely water-tight condition, and which will permit of convenient removal to some place of ultimate disposal as hereinafter set forth.

3. The excreta collected in the aforesaid removal receptacles shall be removed and the receptacles cleaned and deodorized as often as may be found necessary in order to maintain the privy in proper sanitary condition and to effectually and strictly prevent any overflow upon the soil or upon the foundations or floor of the privy. In effecting this removal none of the contents shall be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, so that the least possible annoyance and inconvenience shall be caused to the occupants of the premises or of adjacent premises.

4. Unless otherwise specifically ordered or permitted by the State Department of Health the excreta collected in the aforesaid receptacles shall when removed be disposed of by burying in trenches or by thoroughly digging into the soil in such place and manner as to effectually prevent them being washed over the surface of the ground by rain or melting snow, and at distances not less than two hundred and fifty (250) feet, horizontal measurement, from the highwater mark of any lake, pond or reservoir, or from the edge, margin or precipitous bank of any spring, stream, ditch, gutter, drain or watercourse of any kind, the waters of which comprise, or when running, flow into Trinity Lake, Mud Pond or Mill river within the said State.

5. Whenever it shall be found that owing to the character of the soil or to the surface of the ground or owing to the height or flow of subsoil or surface water or through special local conditions the excremental matter from any privy or aforesaid receptacle or from any trench or place of disposal may, in the opinion of the State Department of Health, be washed over the surface of the ground or through the soil into any lake, pond or reservoir, spring, stream, ditch or gutter, drain or other watercourse, the waters of which comprise or when running flow into the aforesaid Trinity Lake, Mud Pond or Mill river within the said State, then the said privy or receptacle for excreta or the said trench

or place of disposal shall, after due notice to the owner thereof be removed to such greater distance or to such place as shall be considered safe and proper by the State Department of Health.

House Slops, Sink Waste, Laundry Water, Garbage, Refuse, Etc.

6. No sewage, garbage, putrescible matter, house slops, bath water, kitchen or sink waste, refuse or waste water from creameries, cheese factories or laundries, or water in which milk cans, utensils, clothes, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid shall be thrown or discharged directly into any lake, pond, reservoir, spring, stream, ditch, gutter, drain or other watercourse comprising or flowing into Trinity Lake, Mud Pond or Mill river within the said State, nor shall any such liquid be thrown or discharged upon the surface of the ground or into the ground below the surface in any manner whereby the same may flow into any lake, pond, reservoir, spring, stream, ditch, gutter, drain or watercourse aforesaid within one hundred (100) feet, horizontal measurement, of the highwater mark of any lake, pond or reservoir or of the edge, margin or precipitous bank of any spring, stream, ditch, gutter, drain or other watercourse aforesaid.

7. No clothing, bedding, carpets, harness, vehicles, tanks, barrels, receptacles, utensils, nor animals nor anything that pollutes water shall be washed or rinsed in, nor shall any person bathe in any lake, pond, reservoir, spring, stream, ditch, gutter, drain or other watercourse comprising or flowing into Trinity Lake, Mud Pond or Mill river within the State of New York.

Manures, Compost, Etc.

8. No stable for cattle or horses, barnyard, hog yard, poultry yard, cattle pen, pigsty, hen house, hitching place or standing place for horses or other animals, and no manure pile, compost heap, piles of fermented or decayed fruit, apple pumice, cider mill waste, vegetables, roots, grain, leaves or other vegetable substances shall be located, placed or maintained or allowed to remain in such place or manner that the washing or draining therefrom may flow in open, blind or covered drains or channels of any

kind into any lake, pond, reservoir, spring, stream, ditch, gutter, drain, or watercourse aforesaid, without first having passed over or through such an extent of soil as to have become properly purified and in no case shall the above named sources or causes of pollution be so located or allowed to remain that their nearest point is less than one hundred (100) feet, horizontal measurement, from the highwater mark of any lake, pond, reservoir, or the edge, margin or precipitous bank of any spring, stream, ditch, gutter, drain or watercourse of any kind which comprises, or when running flow into Trinity Lake, Mud Pond or Mill river within the State of New York.

9. No human excreta or compost containing human excreta shall be spread upon the ground within two hundred and fifty (250) feet, horizontal measurement, of the highwater mark of any lake, pond, reservoir, or of the edge, margin or precipitous bank of any spring, stream, ditch, gutter, drain or watercourse of any kind whose waters comprise or when running, flow into Trinity Lake, Mud Pond or Mill river in the said State, and no manure or compost of any kind shall be spread or deposited upon the ground so as to be washed a less distance than one hundred (100) feet over the surface or through the soil before reaching the nearest point of any such aforesaid lake, pond, reservoir, spring, stream, ditch, gutter, drain or other watercourse.

Dead Animals, Offal, Manufacturing Waste, Etc.

10. No dead animal, bird, fish, nor any part thereof, nor any offal nor putrescible matter, nor any polluted waters or refuse from any slaughter house, dairy, creamery, cheese factory, cider mill, or other manufactory shall be thrown or allowed to run into any lake, pond, reservoir, spring, stream, ditch, gutter, drain or other watercourse whose waters comprise, or when running flow into Trinity Lake, Mud Pond or Mill river in the said State, nor shall any such refuse or polluted material aforesaid be so deposited that any portion thereof or of the polluted drainage therefrom shall be washed over or through the soil a less distance than one hundred feet before reaching the nearest point of any such aforesaid lake, pond, reservoir, spring, stream, ditch, gutter, drain or watercourse.

11. No dead animal, bird, fish, fowl or reptile, nor any part thereof, shall be buried in the ground within two hundred and fifty (250) feet of the highwater mark of any aforesaid lake, pond or reservoir, or the highwater mark or precipitous bank of any such aforesaid spring, stream or watercourse.

12. No live sheep or other animals shall be washed in any lake, pond, or reservoir, or in any such aforesaid spring, stream or watercourse; neither shall any person swim, bathe or wash in any of said lakes, ponds or reservoirs, streams, or watercourses.

13. The waste liquids which may be polluted with putrescible or deleterious organic matter from any of the operations above indicated shall be all thoroughly filtered or otherwise properly purified before being allowed to escape into any lake, pond or reservoir, or into any spring, stream or watercourse tributary thereto.

Cemeteries

14. No interment shall be made in any cemetery or other place of burial within two hundred fifty (250) feet, horizontal measurement, of the highwater mark or precipitous bank of any lake, pond or reservoir, or of any spring, stream or watercourse whose waters comprise, or when running, flow into Trinity Lake, Mud Pond or Mill river within the aforesaid State.

The foregoing rules and regulations for the protection from contamination of the watershed of the Stamford Water Company within the State of New York, were duly made, ordained and established on the 30th day of June, 1906, pursuant to chapter six hundred and sixty-one (661) of the Laws of the State of New York for 1893, as finally amended by chapter four hundred and eighty-four (484) of the Laws of 1904.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Westchester County, N. Y., and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so

made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit, and filing must be paid by the Stamford Water Company of Stamford, Conn.

WALTON

Rules and regulations for the protection from contamination of the public water supply of the village of Walton, Delaware County, N. Y.

Privies Adjacent to Reservoirs, Springs or Watercourses

Rule 1. No privy or place for the deposit or storage of human excreta shall be constructed, located or maintained within twenty-five (25) feet, horizontal measurement, of the high-water mark or precipitous bank of any reservoir, spring, stream, ditch or watercourse which, when running, flows eventually into a reservoir of the Walton water supply.

Rule 2. No privy vault, pit or cesspool or nontransportable receptacle of any kind for the reception or storage of human excreta shall be constructed, located or maintained within one hundred and fifty (150) feet, horizontal measurement, of the high-water mark or precipitous bank of any reservoir, spring, stream, ditch or watercourse as aforesaid.

Rule 3. Every privy or place for the deposit of human excreta which is constructed, located or maintained between the aforesaid limits of twenty-five (25) and one hundred and fifty (150) feet, horizontal measurement, from the highwater mark or precipitous bank of any reservoir, spring, stream, ditch or watercourse as aforesaid, and from which the said excrement is not at once removed automatically by means of suitable water-tight pipes or conduits to some place of disposal beyond the said maximum limits, shall be arranged in such manner that all such excreta shall be received and temporarily retained in suitable vessels or receptacles, which shall at all times be maintained in an absolutely water-tight condition, and which shall admit of convenient removal to some place of ultimate disposal beyond the said maximum limits.

Rule 4. The excreta collected in the aforesaid removable receptacles shall be removed and the receptacles cleansed and deo-

dorized as often as is necessary to keep the receptcles in proper sanitary condition, and to prevent an overflow of the excreta upon the soil or floor of the privy.

Rule 5. The excreta so collected shall be removed so as to cause the least nuisance possible, and shall be so disposed of that they cannot be washed either over the surface, or through the subsoil, into any reservoir, spring, stream, ditch or water-course of any kind as aforesaid, and shall be so placed as not to cause an offensive nuisance.

Rule 6. Whenever it shall be found that, owing to the porous character of the soil, the height and flow of the surface or subsoil waters, the steepness of the slopes, or other special conditions of the locality, the excremental matter from any privy, cesspool or other receptacle for human excreta may be washed over the surface or through the subsoil into a reservoir or into any spring, stream, ditch or water-course aforesaid, without having been thereby, in the opinion of the State Department of Health, sufficiently purified, then the said privy, cesspool or other receptacle shall, after due notice to the owner thereof, be removed to such greater distance from said high-water mark as shall be considered safe and proper by the Department of Health.

House Slops, Sink Waste, Laundry Water and Other Similar Sewage

Rule 7. No sewage, house slops, sink waste, water in which milk-cans, clothes or bedding have been washed or rinsed, nor any other polluted water or liquid shall be thrown or discharged directly into a reservoir, or into any spring, stream, ditch or water-course aforesaid, nor shall any such aforesaid liquid or solid matter or other polluted liquid be thrown or discharged upon the surface of the ground at any point within 250 feet of any such reservoir, spring, stream, ditch or water-course aforesaid, nor shall any such polluted liquid be discharged into the ground below the surface in any manner whereby the same may flow into any reservoir, spring, stream, ditch or water-course aforesaid without percolating through earth for a distance of at least fifty feet, horizontal measurement.

Rule 8. No clothing, animals, vehicles, nor anything which

pollutes water, shall be washed, nor shall any person bathe in any reservoir, spring, stream, ditch or water-course aforesaid.

Rule 9. No garbage or putrescible refuse of any kind shall be thrown or discharged directly into any reservoir, spring, stream, ditch or water-course aforesaid, nor shall any such substances be thrown or discharged upon the surface of the ground at any point within 250 feet of any such reservoir, spring, stream, ditch or water-course aforesaid, nor shall any such polluted matter be thrown, buried or discharged into the ground below the surface in any manner whereby the same or any washings from the same may flow into any reservoir, spring, stream, ditch or water-course aforesaid, without flowing through the earth for a distance of at least fifty feet, horizontal measurement, to the high-water mark or precipitous bank of any reservoir, or of any spring, stream, ditch or water-course, flowing into any reservoir of the water supply of the village of Walton, N. Y.

Manure, Composts and Similar Matter

Rule 10. No stable, pigsty, henhouse, barnyard, hog or duck-yard, hitching or standing place for cattle or horses, or other place where animal manure accumulates, and no compost or manure heap shall be located or maintained within 125 feet of, nor shall they or any watering place for horses, cattle or other animals be so arranged that the polluted drainings therefrom shall be thrown or discharged upon the surface of the ground at any point within 250 feet of any such reservoir, spring, stream, ditch or water-course aforesaid; nor shall any such polluted liquid be discharged into the ground below the surface in any manner whereby the same may flow into any reservoir, spring, stream, ditch or water-course aforesaid, without percolating through earth for a distance of at least fifty feet, horizontal measurement, nor flow into or through covered drains within fifty feet of the high-water mark or precipitous bank of any reservoir, spring, stream, ditch or water-course aforesaid.

Rule 11. No human excreta nor compost containing human excreta shall be spread upon the ground within 250 feet of the high-water mark or precipitous bank of a reservoir, spring, stream, ditch or water-course aforesaid, and no manures or composts of

any kind shall be deposited so that they may be washed a less distance than 250 feet over the surface of the ground or fifty feet through the subsoil into any reservoir, spring, stream, ditch or water-course aforesaid, without having undergone purification.

Dead Animals, Vegetable Refuse and Manufacturing Wastes

Rule 12. No dead animal, bird, fish, nor any part thereof, nor any filthy or impure matter, nor any decayed fruit or vegetable substance, nor any waste products, putrescible matter or polluted waters from any slaughter-house, dairy, creamery, cider mill or other manufactory, shall be thrown or allowed to run directly into any reservoir, spring, stream, ditch or water-course aforesaid, nor shall they be so deposited that any portion thereof, or of the polluted drainage therefrom, shall be washed on the surface less than 250 feet, or through the subsoil less than fifty feet into any reservoir, spring, stream, ditch or water-course aforesaid, without having undergone proper purification.

Rule 13. No interment of a human body shall be made within 500 feet of the highwater mark or precipitous bank of any reservoir, spring, stream, ditch or water-course aforesaid.

Penalty

In accordance with section seventy (70) of chapter six hundred and sixty-one (661) of the Laws of 1893, as finally amended by chapter five hundred and eighty-two (582) of the Laws of 1906, the penalty for each and every violation of, or noncompliance with, any of these rules and regulations which relate to a permanent source or act of contamination, is hereby fixed at one hundred dollars ($100).

The foregoing rules and regulations for the protection from contamination of the public water supply of the village of Walton, N. Y., were duly made, ordained and established on the 23d day of October, 1906, pursuant to chapter six hundred and sixty-one (661) of the Laws of the State of New York for 1893, as finally amended by chapter five hundred and eighty-two (582) of the Laws of 1906.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations, to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Delaware county, N. Y., and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the water department of the village of Walton, N. Y.

II(c). INSPECTION OF VIOLATIONS OF RULES FOR THE PROTECTION OF WATER SUPPLIES

During the year inspections were undertaken and orders issued with respect to violations of the rules and regulations for the protection of the water supplies of the following municipalities, correspondence in each case being herewith presented:

Auburn

During the year five inspections were made by this division of violations of the rules for the protection of the public water supply of Auburn, which is derived from Owasco lake. Over thirty cases of violations which the local authorities were unable to abate were reported to this Department and were made the subject of orders for abatement issued to various local boards of health having jurisdiction.

Middletown

In the matter of the application of the Board of Water Commissioners of the city of Middletown, N. Y., for the approval by the State Commissioner of Health of certain regulations permitting and governing the privilege of fishing in the public reservoirs of said city.

Under chapter 661 of the Laws of 1893 and chapter 251 of the Laws of 1899, the State Commissioner of Health duly made, ordained and established on May 30, 1903, rules and regulations for the protection from contamination of the public water supply of the city of Middletown, N. Y.

Among the other regulations designed after careful study of the situation appears the following:

"*Boating and fishing.*—(15) Boating, fishing from boats, from rafts, from the shore, and through the ice are hereby prohibited in any and all of the reservoirs of the Middletown water supply.

The board of water commissioners of Middletown, when necessary to regulate or diminish the number of fish in any of the reservoirs, or when in their opinion such privileges may be ex-

tended without endangering the purity of the water supply, are hereby authorized to permit boating or fishing or both under explicit regulations and restrictions. Such permit, regulations and restrictions must first be approved in writing by the State Commissioner of Health.

A violation or non-compliance with any of the restrictions or regulations under which such permit for boating or fishing is issued shall be construed as a violation or non-compliance with this section of the rules and regulations."

On March 17, 1906, the board of water commissioners of the said city passed certain rules and regulations, made with the view of permitting and governing the privilege of fishing in the public reservoirs of that city, under section 15 above quoted; and made application for the approval of the State Commissioner of Health, as therein provided.

The rules so submitted are as follows:

Rules governing boating and fishing in the reservoirs of the city of Middletown, N. Y.

"The board of water commissioners of the city of Middletown, N. Y., deeming it necessary to regulate and diminish the number of fish in its reservoirs and being of the opinion that the privilege of boating and fishing in and upon said reservoirs may be extended without endangering the purity of the water supply of said city,

"Do hereby revoke and sescind all rules and regulations heretofore enacted by said board and affecting the privilege of boating and fishing in and upon said reservoirs and pursuant to section 15 of the rules and regulations made by the said board of health relative to the water supply system of the said city of Middletown,

"Do hereby authorize boating and fishing in Monhagen reservoir, Highland reservoir and Shawangunk reservoir, subject to the following by-laws and regulations, to-wit:

"Monhagen reservoir

"Section 1. Permits authorizing the holders thereof to fish in Monhagen reservoir from May 1st to June 16th in each year, both dates inclusive, Tuesdays, Thursdays and Saturdays of each week, and from June 17th to June 30th in each year, Tuesdays, Thurs-

days and Saturdays of each week, and from July 1st to August 31st in each year, Tuesdays and Fridays of each week, and from September 1st to November 30th, both dates inclusive, in each year, Tuesdays, Thursdays and Saturdays of each week. Also in

"*Highland reservoir*

"From May 1st to June 15th in each year, both dates inclusive, Mondays, Wednesdays and Fridays of each week, and from June 16th to July 1st in each year, both dates inclusive, Mondays, Wednesdays and Fridays of each week, and from July 1st to August 31st, both dates inclusive, in each year, Mondays and Fridays of each week, and from September 1st to November 30th of each year, both dates inclusive, Mondays, Wednesdays and Fridays of each week. Also in

"*Shawangunk reservoir*

"From July 1st to August 31st, both dates inclusive, in each year Wednesdays and Thursdays of each week will be granted by the said board of water commissioners, of the city of Middletown, N. Y., subject to the by-laws, rules and regulations made by the said board of water commissioners and the State Board of Health and the Fish and Game Laws of the State of New York, and the Public Health Laws of the State of New York.

"§ 2. Permits authorizing the holder thereof to fish in the said reservoirs owned by the said city of Middletown, and to use the boats upon said reservoirs, will be granted on application to the clerk of said board of water commissioners, upon payment of the following fees:

"(1) For the privilege of fishing from the shores for one day, with rod and line only, twenty-five cents. (2) Fishing from shore with rod and line only, from May 1st to November 30th, both dates inclusive, during one year, two dollars. (3) Fishing from a boat from May 1st to November 30th, both dates inclusive in each year, and the privilege of placing a boat upon any one of the said reservoirs of said city of Middletown, ten dollars. (4) The joint ownership of a boat shall be limited to two persons and if any boat shall be owned by two persons a duplicate permit shall be issued to each pursuant to these by-laws and regulations upon the

payment of ten dollars which shall be the cost of the permits for both persons.

"§ 3. Permits to fish in the reservoirs may be granted free of cost for one day only, to needy and deserving persons, upon presenting to the clerk of said board of water commissioners a request duly endorsed by two of the members of said board of water commissioners.

"§ 4. No permits will be issued to a person under sixteen years of age unless accompanied by a parent or guardian, and such parent or guardian before such permit is issued to a minor under sixteen years of age must countersign the permit so issued to the minor.

"§ 5. No permits will be issued or valid until the permit has been duly signed by the person applying for such permit, countersigned by the clerk of the said board of water commissioners.

"§ 6. The person to whom a permit has been duly issued must, when exercising the privileges granted under said permit, upon demand exhibit the said permit to any member of the board of water commissioners or to any of the employees, agents or representatives of said board of water commissioners.

"§ 7. It shall be unlawful for the holder of a permit to fish in said reservoirs before the hour of sunrise or after the hour of sunset.

"§ 8. No boat shall be used upon any of the said reservoirs of said city of Middletown, unless the same shall be accompanied by the owner or one of the owners of said boat, and no person shall be permitted to use or occupy any of the boats on said reservoirs, unless said person shall have first procured a season permit or a single day permit, authorizing the holder thereof to fish in the reservoirs owned by said city.

"§ 9. Permits will not be issued to a nonresident except upon the recommendation of two residents of the city of Middletown, with the endorsement of two of the said water commissioners of said city; and no permits will be issued to a person or persons selling fish caught from the reservoirs.

"§ 10. Each person or persons, upon procuring a season permit, authorizing the placing of a boat upon said reservoirs must, before placing a boat upon any of the reservoirs, have the said boat numbered in a prominent manner, with the number which

will correspond with the number of the permit issued to said person or persons, and he or they must also provide for the use of and keep in said boat, a pail, sponge and cuspidor. Each boat must be kept free from all dirt and dirty water, and the dirt and water and other substances removed from each boat and from the cuspidor and pail in each boat must be taken to a place provided for by the water commissioners at each reservoir for the depositing of refuse.

"§ 11. Each boat must be docked or fastened to a place at each reservoir designated by the said board of water commissioners, and no boat will be allowed to leave the shore unless accompanied by the owner, or one of the owners of said boat. No boat will be permitted to carry more than four people at one time.

"§ 12. Only a pole and line shall be used by a person having the privilege of fishing from the shore, and no person so fishing from the shore shall stand or sit within three feet of the edge of the water.

"§ 13. Fish must not be cleaned or washed in any boat or in the waters of any said reservoirs or at any place on the watershed, and all fish caught in any of said reservoirs must be taken off the watershed.

"§ 14. The said board of water commissioners reserves the right to refuse the issuing of a permit or to revoke any permit issued at any time and for any reason which said board in its judgment may deem sufficient.

"No permit will be issued to a person violating, or who has violated any of the foregoing by-laws or regulations or violating or who has violated any of the rules and regulations of the State health laws or of the State Board of Health made in protection from contamination of public water supplies.

"The above most respectfully submitted,

C. J. THAYER
H. H. BLANCHARD
GEO. T. WALKER
"Committee on Rules Regulating Fishing."

Subsequently, and after a conference at my office with members of the Board of Water Commissioners and citizens of the city of

Middletown, it was deemed advisable to hold a public hearing on the question of the approval of the aforesaid rules; and, after notice to the said board and to the public that a hearing would be held in the city of Middletown on May 12, 1906, at 10 o'clock, a. m., I attended at that place and conducted a hearing, at which a large number of the residents of the city of Middletown were present. Ample opportunity was allowed all who desired to speak on the subject to be heard, and that the people of the city of Middletown are deeply interested in this question is evidenced by the fact that over twenty-five prominent citizens of the city voiced their sentiments on the subject, either for or against.

Stenographic notes were taken of the hearing, and the arguments advanced have been carefully read over.

I also made a personal inspection of the three reservoirs used by the city as a water supply and the filtration plant in connection with the same, in order to familiarize myself thoroughly with the local situation.

Technically, the question before the Department is:

"Shall the existing rules and regulations now in force for the protection of Middletown's water supply be so modified as to allow fishing, under certain proposed restrictions, in the three ponds or reservoirs constituting the water supply of the city?"

Underlying this, however, may be found the real and vital point at issue. The question is not whether fishing may or may not be permissible, but whether should fishing be allowed there, would there exist a very possible danger of the contamination and pollution of Middletown's water supply. Upon the answer to this question the decision must necessarily depend. Fishing *per se* under proper conditions is undoubtedly a most harmless diversion. In lakes or ponds not used for potable water supplies, fishing may be, and in fact is, permitted with scarcely any restrictions. But where water is impounded in reservoirs for public use, the character of the situation is entirely changed. Sport is a good thing and should always be encouraged when possible, but the public health is paramount even to sport.

The State Board of Health of New Jersey disapproves of fishing in reservoirs and private water companies in the State have in some instances prohibited fishing in the reservoirs they control.

The State Board of Health of Ohio recently refused to approve the granting of a lease giving to a fishing club the right to fish in a storage water reservoir.

The State Board of Health of Massachusetts announces that the use of public waters for boating and fishing is neither encouraged nor permitted except in rare cases; as a matter of fact, a bill, which passed the present Legislature permitting boating and fishing in several of the large ponds within the metropolitan water district, was vetoed by the Governor on the ground that public water supplies should be protected from all possible contamination; and the veto was sustained by an overwhelming majority.

The Department of Health of Pennsylvania has ruled that hereafter no permits will be granted allowing boating or fishing in any public water supplies within the State.

It may be added to this that, at the conference of health boards and departments at Washington last May, the opinion was unanimous that too strict precautions could not be taken in protecting all public water supplies from possible contamination and pollution.

Experience has shown that regulations governing fishing, when allowed under restrictions, in public waters, have had but slight and fleeting observance, and even if more rigidly enforced, the danger of sewage contamination would be always present. It will, perhaps, be remembered that the dejecta of a single typhoid patient washed into a reservoir may be the cause of a thousand cases and a hundred deaths — as at Plymouth, Pa. Let it be remembered also that, not only does pure water keep down the typhoid death rate, but that there is also a reduction in the general death rate as well. Experts agree that for the reduction of one death by typhoid fever there is a corresponding reduction of three or four deaths from other diseases.

Consideration of the proposed rules governing fishing in the Middletown reservoirs leads to the conclusion that their enforcement would be impracticable. An efficient patrol could not be maintained, and without it such slight protection as the rules might offer would be absolutely nullified.

The city of Middletown has expended nearly $800,000 in the establishment of a public water supply that shall be as pure as

scientific knowledge and intelligent supervision may be able to make it. To this end it has not only preserved the impounding reservoirs from direct and immediate contamination, but it has wisely gained control practically of the entire watershed and removed from it all possible sources of pollution. It has added to this a filtering system which, while not of the highest order, is still measurably efficient. Its low death rate and its continued freedom from serious epidemics may justly be attributed in no small degree to the purity of its water supply.

In the face of these facts, and in defiance of the best opinion of leading authorities on sanitation, to grant a permit for fishing would be to ignore the highest welfare of the citizens of Middletown and evade what seems to be a very plain and obvious duty.

The water supply of the city of Middletown, now pure, must be kept so far as is humanly possible free from any and all possibility of contamination and pollution.

It may be said with emphasis that the health of the people of Middletown (including the fishermen) is the chief concern of your department of health.

To protect that health — to guard it, not only for the present but for time to come — is a duty and responsibility that it cannot avoid and must discharge to its best ability and judgment.

I am therefore of the opinion, and must hold, after a careful consideration of all the facts, evidence and authorities available on this subject, that the application of the board of water commissioners of the city of Middletown for approval of the rules submitted to me, must be denied.

EUGENE H. PORTER,
Commissioner of Health

Dated *July* 10, 1906.

Memorandum on Violation of Rules for Protection of the Water Supply of the city of Middletown

On May 11, 1906, during a hearing and the inspection of the reservoirs of the city of Middletown, the board of water commissioners notified the Commissioner of Health of a violation of the rules on the shores of the Highland reservoir by one Andrew Conkling who, it was alleged, had spread manure upon the shores of

the reservoir within the prescribed distance set forth in the rules. It was stated that a notice, calling his attention to the violation, had been served upon him on May 10th, and under section 71 of the Public Health Law, which provides that "If the person served does not immediately comply with the rule or regulation violated, such officer, board or corporation shall notify the State Board of the violation, which shall immediately examine into such violation."

The Commissioner of Health, accompanied by the board of water commissioners, the superintendent of the waterworks and the secretary of the Health Department, made a personal inspection and found that, on the premises occupied by the said Conkling, and within 40 to 100 feet of the shores of the Highland reservoir, a large amount of manure had been placed on the ground and plowed into a garden, applied in direct violation of rule 12 of the rules for the protection of the Middletown water supply, enacted by the New York State Commissioner of Health on May 30, 1903.

An order was therefore made by the Commissioner of Health on May 12th, ordering the board of health of the town of Wallkill to at once convene and enforce obedience to said rule or regulation as required by section 71 of the Public Health Law. This order was delivered to the clerk of the board of waterworks to be served upon the said board of health.

PEEKSKILL

PEEKSKILL, N. Y., *June* 16, 1906.

State Commissioner of Health, Albany, N. Y.

DEAR SIR:— Last fall as chairman of the watershed committee of the board of water comissioners of Peekskill, N. Y., I had a careful inspection made of our entire watershed from the intake at our pumping station to the various sources of our water supply and I found a number of instances that in my judgment were violations of the rules and regulations the State Board had fixed and adopted to govern our watershed.

But as most of these violations have been known to former boards and no action taken, I hesitated to recommend our board to

take action unless supported in such recommendation by the State Board of Health, as no doubt it will involve litigation and perhaps much expenditure on the part of the board of water commissioners which possibly is the reason no action has been taken by former boards.

Would it be possible to arrange to have an inspector sent from the State Department to meet me and go direct to the points in question and then have the State Board advise me in the matter. If so, I would suggest that it be arranged soon as the conditions at some points are now at their worst.

An early reply will greatly oblige

Yours respectfully,

ASBURY BARKER,

Chairman of Watershed Committee

ALBANY, N. Y., *July* 25, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— At your request on July 19th, I met certain members of the board of water commissioners of the village of Peekskill, namely, Messrs. Barker and Ott, and with them inspected certain portions of the watershed supplying the village reservoir.

Numerous cases exist of violations of the rules and regulations enacted in 1897 for the protection of the Peekskill water supply. At many points visited on the Peekskill Hollow creek and Oscawanna drainage areas, conditions are such as to demand immediate action and I should recommend that you suggest to the water commissioners at Peekskill that a careful inspection of the entire watershed tributary to the diverting point at the pumping plant be made immediately, and that proceedings be instituted to remove all sources of pollution as defined by the rules, or found to exist though not covered definitely by the rules.

An opinion is desired by the commissioners as to the liability of property owners who have erected buildings in violation of the rules since their adoption.

Respectfully submitted,

H. B. CLEVELAND,

Inspecting Engineer

ALBANY, N. Y., *August* 1, 1906.

Board of Water Commissioners, Peekskill, N. Y.:

DEAR SIRS:—One of the inspecting engineers of this Department recently visited Peekskill and, in company with members of your Commission, inspected certain portions of the watershed supplying the village reservoir.

He reports to me that numerous cases exist in violation of the rules and regulations enacted in 1897 by the State Department of Health for the protection of the village of Peekskill public water supply. He states that at many points visited on the Peekskill Hollow road and Oscawanna drainage areas, conditions are such as to demand immediate attention and action.

Therefore, under the power vested in me by section 71 of the Public Health Law, as amended by chapter 582 of the Laws of 1906, I direct the board of water commissioners of the village of Peekskill to make a careful investigation of the entire watershed tributary to the diverting point at the pumping plant immediately, and that such proceedings as may be necessary be instituted to remove the sources of pollution as defined by the water rules above referred to and found to exist, although not covered definitely by said rules.

The Board should see that this inspection is made at once, as above directed, and proper steps should be taken to see that the rules are complied with in all cases and that violations are prosecuted as provided by the law.

I will be very glad to hear from you as to what the result of your inspection discloses and trust that the importance of enforcing the rules for the protection of the public water supply is so apparent to the members of the Board as to need no further comment on my part.

Notices should be served in all cases where violations are disclosed, as provided by said section 71 of the Public Health Law, which said notices should be accompanied by a copy of the rule or regulation violated. If the rule or regulation is not immediately obeyed, notice should be given this Department at once and an examination will be made into the violation.

I trust that this matter will receive your immediate attention

in the interests of the health of the people of the village of Peekskill, and for the preservation of the purity of your water supply.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

SYRACUSE

The attention of the Department was called to alleged violations of the rules and regulations enacted by the State Commissioner for the protection of the water supply of the city of Syracuse which is derived from Onondaga lake.

Following are reports and correspondence in the matter:

ALBANY, N. Y., *September* 10, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In regard to the *contamination of Skaneateles lake* by residents along the shore, especially in the vicinity of Glen Haven and Fair Haven, and the possible danger to the water supply of Syracuse which is claimed by residents and the daily papers of Syracuse, I beg to report as follows:

From the various correspondence in this matter and the reports of the health officer, D. M. Totman, Bacteriologist W. H. May of the Syracuse Health Department, and the reports of the special committee appointed by the mayor to investigate the condition of the pollution of the lake, the following facts appear to be brought out:

I. That outside Glen Haven and Fair Haven, there were until recently a number of cases of violation of the Health Law regarding the protection of the Syracuse water supply. Through the efforts of the health officer and board of water commissioners of Syracuse, these cases of violation have been practically all remedied and the remaining ones will at an early date be rectified;

II. That in the vicinity of these two places which are located at the upper end of the lake some 13 miles from the intake, there is at the present time a number of offenders, more especially hotels that discharge raw sewage into the lake;

III. That the Mayor, in view of the existing contamination of

the upper end of the lake, has recommended the installation of a sewage disposal plant on the "Waring System" in order to protect the shore in the vicinity of these settlements and especially with a view to protecting the present water supply of Syracuse.

Without visiting the locality I have carefully considered the amount of pollution and the relation of points of contamination to the intake of the Syracuse water supply. I have also considered the reports of the Bacteriologist May and the confirmatory reports of the Health Officer Totman, and present the following evidence herewith bearing upon the sanitary aspect of the case:

(1) That the sewage from not over one or two hundred persons now discharges into the lake and that this amount is discharged at the most distant point of the lake from the intake of the Syracuse water supply.

(2) That this small amount of sewage is discharged into a volume of water so large that by dilution and sedimentation alone there would be no probability of any sewage reaching the intake.

(3) That the time required for sewage to reach the intake were it held in suspension, would on reasonable assumption consume the period of more than a year and that, during this long period, any pathogenic bacterial life would become extinct. This is verified by May's report that no colon bacilli were found in the lake further north than one-quarter mile from Glen Haven.

In view of the above, I am of the opinion that under present conditions there is no danger existing to the water supply. I note, however, that the discharge of raw sewage into Skaneateles lake is a violation of the rules of this Department for the protection of the water supply of Syracuse and, in accordance with such rules, Glen Haven and Fair Haven should be required to introduce sewage purification plants at an early date.

Respectfully submitted,

THEODORE HORTON,

Consulting Engineer

III.

INVESTIGATIONS RELATING TO STREAM POLLUTION

III(a). EXAMINATION OF SPECIAL SOURCES OF STREAM POLLUTION

Alden

On September 13, 1906, the following communication was addressed to the president of the board of health of the village of Alden:

ALBANY, N. Y., *September* 13, 1906.

Mr. JOHN W. KIRK, *Pres. Board of Health, Alden, N. Y.:*

DEAR SIR:— Repeated complaints have been received by this Department relative to the pollution of a stream in Alden by the discharge of refuse from a tannery there.

This is in violation of the provisions of the Public Health Law and must be stopped. The law provides that the local board of health shall promptly ascertain every violation or noncompliance with any of the provisions of the act relating to the discharge of refuse into any of the waters of the State and that, on the discovery of such violation, it shall serve a notice in writing upon the person or corporation responsible for the violation or noncompliance, together with a copy of the act, specifying the particular provision being violated, and stipulating the length of time within which the violation must cease. If, at the expiration of the stipulated length of time, the violation still continues, it is your duty to report the matter at once to this Department when a hearing will be had and, if it is found that the violation still exists, an action will be brought for an injunction.

As president of the board of health of Alden, you are hereby directed to ascertain what the conditions are with reference to this violation of the law and, if you find that such violation exists, you are instructed to serve the notice required by section 79c of the Public Health Law and make a report to me at the end of the time stipulated in the notice, which should not be over ten or fifteen days.

It is my purpose to prosecute this matter thoroughly and I wish to hear from you at once as to what action you have taken in the matter.

Very respectfully,
EUGENE H. PORTER,
Commissioner of Health

ALDEN, *September* 15, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health:*

DEAR SIR:— Yours of Sept. 13th received. In reply will say that Mr. Kirk, president board of health, made a report in reply to your first communication. I was about to report what had been done after the receipt of your second when your inspector called, and after going over the ground said it would not be necessary for me to do so, as in his report to you he would make all necessary report in the matter. I am sure I have done everything possible in the matter and supposed it was so understood by you. The present situation is this: The tannery is shut down from working. They are digging a cesspool in which to run the discharge from the tannery and seem to be doing all they can to keep refuse out of the stream.

I do not think the smell which arises from the stream is due so much to what is being run into it this year as to the fact that the stream has been used for seventy-five years as a discharge for the tannery and the soil is saturated with this refuse. And in a long hot dry spell like the present one has been, is more noticeable than it has been for some time past. As I said above they have shut down from work and will not commence again until they can run all discharge into the cesspool which they are constructing and which I think will obviate all difficulty. I have also examined the several slaughter houses in the town and find them well taken care of and cleanly.

There is also a bath house in the village which has been discharging its refuse upon the surface of low ground adjoining the tannery creek. They also have agreed to put in a cesspool to receive the discharge, and when done, I think everything pertaining to the sanitation of the village and town will be properly

attended to. Hoping what has been done will meet with your approval, and that this will fully explain all matters, and that you will accept this in answer both to your communication to Mr. Kirk, president of the village board of health, and myself, I remain

Very respectfully,
C. E. BOWMAN,
Health Officer

ALBANY, N. Y., *September* 17, 1906.

C. E. BOWMAN, M. D., *Health Officer, Alden, N. Y.:*

DEAR SIR:— Replying to your communication of September 15th, I am very glad to hear from you with your report on the situation at Alden. I am pleased to note that the matters are receiving attention and that the premises will be put in a sanitary condition. I trust that you will advise me should any complaint arise in the future, as it is my intention to prosecute cases of this kind where an objectionable discharge of refuse is made into a stream.

I trust that your board will continue to give this matter attention and see that the necessity of future complaints in regard to this tannery is obviated.

Very respectfully,
EUGENE H. PORTER,
Commissioner of Health

AU SABLE RIVER

ALBANY, N. Y., *December* 22, 1906.

Honorable FRANK W. HIGGINS, *Governor, Albany, N. Y.:*

SIR:— In compliance with your directions under date of December 17th, I have the honor to report to you my investigation of the *conditions existing on the Au Sable River.*

This subject was made the matter of a rather complete study and report to the department in May, 1904, at which time the general pollution of Lake Champlain, Bouquet river and Au Sable river were investigated, including the specific pollution of Au

Sable river by the *J. & J. Rogers Company,* and which report is printed in the 25th annual report of this Department at page 620.

In order to compare intelligently the conditions which at that time were found to exist with those found during my inspection of December 20th, it will be well to first present briefly the salient facts recorded in the former investigation and report, as follows:

"J. & J. Rogers Co. is a domestic corporation, originally incorporated in 1871 as the Rogers Iron Company, but reincorporated in 1893 under the present form of corporate title. The officers of the company are: James Rogers, president, Au Sable Forks; J. M. Sheffield, secretary, Au Sable Forks; Henry Rogers, manager of pulp mill, Au Sable Forks.

The company manufactures spruce pulp and manila papers, using for this purpose upward of 100 cords of wood per day. The process used in the making of the pulp is 'the sulphite of lime process,' in which the encrusting lignin of the wood is dissolved by cooking or 'digesting' the chipped wood in a weak solution of bisulphite of lime, liberating the fibre, which is largely cellulose."

The company employs at the sulphite mill about 150 men and about thirty at the paper mill adjoining. The procedure is the usual sulphite-mill practice; the wood is prepared for the digesters by chipping and screening; there are five digesters; four of them are ten feet diameter by thirty feet in height, and one is fourteen feet diameter and thirty-eight feet in height. The sulphite liquor used for cooking the wood is formed by passing the fumes of burning sulphur through lime water, the sulphurous acid formed uniting with the lime to form bisulphite of lime and some uncombined free sulphurous acid. After digesting for several hours until the fibre has been sufficiently separated or loosened from its encrusting lignin, the contents of the digester are blown out into tanks where the waste liquor, containing the dissolved portions of the wood, in combination with the sulphite of lime, and the remaining free sulphurous acid that has not been recovered, is washed out and discharged into the river or elsewhere, leaving the fibrous pulp alone in the tanks."

It was estimated that the 100 cords of wood used per day by the Rogers Company at the time of the inspection in 1904 furnished the following amounts of manufacturing waste which was

at that time all discharged into the west branch of the Au Sable river, just above the junction with the east branch:

Kind of Refuse.	Lbs. per day.	Lbs. per year of 350 days.
Woody waste (dry wt.).........	150,000	52,500,000
Sulphur (dry wt.)	6,000	2,100,000
Lime (dry wt.)	15,000	5,250,000
Total in liquor (dry wt.) ..	171,000	59,850,000

The effect of the discharge of these wastes into the waters of the Au Sable river under conditions which existed at the time this matter was investigated and reported upon in 1904 may be more readily understood by quoting from the conclusions expressed in the report, viz.:

"(8) The discharge of refuse sulphite liquor, lost fibre and other wood waste from the sulphite pulp mills of the J. & J. Rogers Co. at Au Sable Forks, amounting to at least 171,000 pounds per day, or about 60,000,000 pounds per annum (dry weight) is the cause of serious pollution not only in the Au Sable river, but in the lake.

"(9) The pollution of the Au Sable river from the sulphite pulp mills at Au Sable Forks discolors the water, gives it a strong odor which is offensive to many people, fouls the banks, has seriously injured the water supply of the village of Keeseville, and renders the river water generally unfit for domestic purposes.

"(10) The refuse discharged into the river from the mills is, for the most part, carried into the lake partly throughout the year and partly at times of freshet. Settling and accumulating on the bottom, being mainly organic wood matter, it contributes materially by its decomposition to the stock of plant food for the algae and other micro-organisms which form the chief ground of complaint concerning the lake shore.

"(13) The discharge or refuse sulphite liquor, lost fibre and other wood waste from the sulphite mills at Au Sable Forks can also be avoided and at a cost which at the worst would not be prohibitory. Even if the company should not succeed in

developing a system whereby it might recover as waste products some of the woody materials now lost, it is stili feasible to devise a system by which the refuse liquor may be evaporated and its solid constituents burned along with the other forms of wood waste, and at a cost which would not be prohibitory to operate."

Attention was called in this report to the efforts of the J. & J. Rogers Company which had been made and were in contemplation, looking to a solution of this difficult problem of disposing of these wastes in a manner that would be satisfactory from a sanitary standpoint and at a cost which would not be prohibitory.

In fact, this report states that "The sincerity of the company, in its efforts to discover such a method, cannot be questioned," an opinion which, after my recent investigation, I heartily concur in; and, although the report states that "in promptness and activity in this search it (the company) has left very much to be desired," I found that the company has not only demonstrated by persistent studies and costly experiments that these wastes can be disposed of by utilization in a manner which, with our present knowledge of the difficulties involved, may be considered reasonably satisfactory, but also it can be done at a cost that is not only not prohibitory but possibly profitable.

On December 20th I found the conditions at the plant, outside of the question of disposal of waste, about the same as that described and reported to the Department in 1904. The materials used in the manufacture of pulp and paper were practically the same and the character and amount of waste refuse also practically unchanged. With respect to the utilization and disposal of the iron waste refuse in the pulp mill, however, I found that a plant for the purpose of disposing of these wastes by utilization, known as the Robeson Process Company, had been constructed at a cost of some $40,000 to $50,000, which, when in operation, is claimed to be capable of dealing with the entire volume of "acid wastes" produced by the pulp mill.

The plant was not in operation so that the condition of pollution, as described in the previous report of 1904, existed substantially at this time. A careful inquiry was made, however, of the efficiency and capacity of the plant and of the periods during which this plant has been in operation since the installation in

July, 1904, and of the prospect of increasing the efficiency and the periods of operation to the point of treating the entire output of iron refuse from the mills.

The plant is run as a private patented enterprise and, when operating continuously, is capable of treating practically all of the acid refuse of the mill. The final product is one that has a marketable value and in the present stage of development of this new industry has two or more commercial uses. It is claimed that owing to the lack of facility for storing the product and present limited market for the same, the plant has not been run continuously. From records and careful inquiry, it is estimated that the plant has been run for only about one-sixth of the time; but that, during this time of operation, it has practically utilized the entire output from the pulp mill. Thus, during the summer months of July, August and September of 1904 and 1905, the plant was operated continuously during the day. The night flow from the mill was consequently not treated. During the remaining months of the year, the plant has been run at intervals during the daytime, in accordance with the market demand for the product.

It thus appears that. since the report of 1904, the conditions at the J. & J. Rogers mill, so far as relates to the pollution of the Au Sable river, have been changed in the following respects:

I. That a utilization plant has been constructed which is capable of treating with a considerable degree of success approximately the entire volume of acid waste which is created by the pulp mill and which was, prior to July, 1904, discharged into and seriously polluted the waters of Au Sable river.

II. That this plant, for reasons above set forth, has been operated intermittently to the extent of about one-sixth of the time since it was put into operation in July, 1904.

I am returning to you herewith the original petition signed by certain riparaian owners of Clinton and Essex counties, asking for an executive order in this matter; together with the exhibits submitted therewith, consisting of a copy of the petition filed in 1903 and upon which the original investigation was based; a copy of the 25th annual report of this Department; and a copy of the

order of Governor Roosevelt regarding the pollution of Saratoga lake.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

BROCKPORT

Brockport Sewage Disposal Plant

The facts in the case are as follows:

An application was made to the State Department of Health during the year 1903, for the approval of plans for a sewage disposal plant for the village of Brockport, Monroe county, N. Y. These plans were submitted by the village authorities, and were approved on October 20, 1903, under the following conditions:

The right was reserved to require from time to time such changes or modifications in the disposal works or the effluent as might in the judgment of the State Commissioner of Health be necessary.

The plans as approved called for the construction of a disposal plant, located just outside the village boundary on a small stream of water flowing northerly, and emptying into a larger stream in the town of Clarkson.

Application was made by the village authorities to discharge the effluent from the disposal plant into this stream.

A hearing was granted on such application by Dr. Daniel Lewis, at that time State Commissioner of Health. Such hearing was held in the village of Brockport. At that time the application was opposed by one Gifford Morgan, the owner of a farm between the disposal plant and the large stream, and through whose land flows the small stream, into which it was proposed to discharge the effluent.

The matter was adjourned by Dr. Lewis for further consideration, and he subsequently made a decision in which he approved the application and granted his consent to the construction of such disposal works on condition that the village would construct and maintain a sewer from the disposal works to carry the effluent into the larger stream; subsequently the village authorities secured a modification of this decision under which they were permitted

to discharge into the small stream temporarily, and ever since the effluent has been so discharged.

An examination of the conditions at the sewage disposal plant was made by Prof. Olin H. Landreth, one of the consulting engineers of the department, in January, 1905, and in March, 1905, a further examination was made by Mr. J. J. R. Croes, one of the consulting engineers of the Department.

At about this time Hon. W. W. Armstrong, attorney for the village of Brockport, and Mr. Merton E. Lewis, attorney for Mr. Morgan, the owner of the farm through which the small stream flows, appeared before Dr. Lewis and stipulated that if he would cause an expert chemical and bacteriological examination to be made of the purified effluent then being discharged into the small stream, and if such examination should show that it was improper to continue such discharge, the Commissioner issue an order requiring the village to construct a sewer to convey the effluent to the larger stream, and then the village should proceed with such construction.

Dr. Lewis caused such expert chemical and bacteriological examination to be made, but no formal order announcing his decision appears in the records of the State Department of Health, and the matter was therefore brought before me for my decision subsequent to my appointment as Commissioner of Health on May 8, 1905, and the application of Messrs. Armstrong and Lewis, attorneys for the respective parties, was by mutual consent renewed before me.

I have therefore taken up the question involved as though the application was an entirely new one, and have made a careful examination into the conditions both personally and through my representatives, and have caused numerous examinations, both chemical and bacteriological, of the effluent itself and the water in the stream, both above and below the point of discharge.

The question to be decided is, shall the village of Brockport be allowed to continue to discharge the effluent from the sewage disposal plant into the small stream or shall it be obliged to construct a sewer to convey the effluent into the larger stream in the town of Clarkson?

The answer to this question depends entirely on the character

of the effluent and its effect upon the stream into which it is discharged.

The water in this small stream which receives the effluent comes in part from the canal and in part is a natural source; it is more or less contaminated and upon examination above the point where the effluent is discharged was found to be of unsatisfactory quality.

Examinations repeatedly made of samples taken from the stream below where the effluent is discharged show increased amounts, as was to be expected, of chlorine, nitrogen compounds and total solids.

This increase, however, was not sufficient to appreciably contaminate the stream, the volume of water being ample to dispose of it.

Examination made of the effluent itself shows it to be of very satisfactory quality.

My personal examination of the stream and the results of the analyses which I have had made from time to time have failed to convince me that the conditions are such as to render it necessary for the village of Brockport to construct a sewer to carry off the effluent.

So long as the present conditions remain unchanged, i. e., the volume of the stream not being materially lessened and the quality of the effluent continues satisfactory, I am of the opinion that the village of Brockport should be allowed to discharge its effluent into the stream, and a permit to that effect will be issued upon the conditions above stated.

EUGENE H. PORTER,
Commissioner of Health

Dated *May* 5, 1906

CANANDAIGUA OUTLET

FOREST, FISH AND GAME COMMISSION,
ALBANY, N. Y., *May* 8, 1906.

State Department of Health, Albany, N. Y.:

GENTLEMEN:— The enclosed communication has been received by this Department, and we would ask your honorable body to investigate the matter as it contains information over which we

have no control. Our protector, Mr. Reed, who lives at Canandaigua, will look after the matter as to the killing of fish, but a more important state of affairs exists than the killing of the fish, and we trust that your Department will relieve us from that part of it. The same is respectfully submitted.

Very truly yours,

M. C. WORTS,

Acting Chief Protector

To the Honorable, The Forest, Fish and Game Commission of the State of New York:

Whereas, Certain persons or corporations living or conducting their business in the town of Canandaigua are now, and for a long time past have been, causing certain injurious substances to flow into the waters of the Canandaigua outlet, which said substances permeate the waters and cause serious loss and damage to persons whose lands adjoin said stream, in as much as cattle and stock will not drink said water, and that the fish which have been stocked in said stream are killed thereby and are rendered worthless and undesirable and possibly dangerous to health for edible purposes, now be it

Resolved, That we, the town board of the town of Manchester, do hereby protest against the said wrongful acts of said persons or corporations and request your Honorable Board to make such investigation and take such action in reference thereto as will cause the abatement of said nuisance.

J. C. VAN ARSDALE,

Supervisor

CHAS. H. DAVISON,

Town Clerk

T. V. FOX,
J. F. LINES,
H. D. COATES,
A. DUNHAM,

Justices

ALBANY, N. Y., *July* 25, 1906.

Dr. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In accordance with your instructions on July 19th I visited the village of Canandaigua, and in company with the health officer, Dr. Hallenbeck, inspected the Canadaigua Outlet, complaint of which was made to this Department some time in May.

On account of heavy rains the water in the outlet at the time of my visit was too high for any nuisance to be appreciated and the immediate cause of the complaint, as explained in the letter of Dr. Hallenbeck, was the leakage into the outlet of crude oil used in one of the manufacturing establishments on the shore of the outlet.

While this immediate cause of pollution has been removed, there is no doubt but that, in the summer time, when the dams and gates regulating the discharge of water from the lake are holding back such water so that but little water runs in the outlet and in the feeder, which is a part of the outlet and into which the sewers of the village discharge, there may be formed a large nuisance due to the decomposition of the organic matter.

On account of the grade, or lack of grade in the lower ends of the two outfall sewers, no disposal works other than a sedimentation or septic tank could be built and maintained without pumping, and the nuisance could be removed if sufficient water from the lake were allowed to flow down the feeder and so dilute the sewage.

I am of the opinion that, in order to abate the nuisance, two steps should be taken: First, septic tanks of proper size should be installed on the line of each outfall sewer; and, second, the proper regulation of the gates holding back the water from the lake should be provided, so that a dilution of at least twenty-five fold may be at all times had in the stream.

Very respectfully,

H. N. OGDEN,
Assistant Engineer

ALBANY, N. Y., *August* 13, 1906.

MR. A. E. COOLEY, *President of the Village, Canandaigua, N. Y.:*

DEAR SIR:— Sometime ago complaint was made to this Department regarding the pollution of the Canandaigua outlet. One of our engineers made an inspection of the local conditions and I enclose you herewith a copy of his report. You will note what he says therein, and I would particularly call you attention to his recommendation that, in order to abate the nuisance, two steps must be taken: First, septic tanks of proper size should be installed on the line of each outfall sewer; and, second, the proper regulation of the gates holding back the water from the lake should be provided, so that a dilution of at least twenty-five fold may be at all times had in the stream.

I would recommend that you give this matter your careful consideration and advise me at your convenience. The matter of the question of sewage disposal is one which should receive the careful consideration of your village authorities and, in all probability, the State will soon require that some disposition be made of your sewage.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

CANANDAIGUA, N. Y., *August* 20, 1906.

DR. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:—Your communication to this board, of August 13th, has been referred to me. We are anxious to dispose of our sewage so that it will not be a nuisance. We are *ready now* to take up the preliminary work.

Please advise us the course to take, so that when we shall have completed the work it will be satisfactory to your Department and our sewage no longer a nuisance.

Very respectfully,

O. J. HALLENBECK,

Health Officer

AMSTERDAM, N. Y., *August* 24, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In the matter of advising the village authorities of Canandaigua as to the proper steps for them to take in planning to purify the sewage from the village before its discharge into Canadaigua outlet, I would suggest that the advice of a competent sanitary engineer be solicited and when the preliminary plan or outline of proposed work has been settled upon, that such plan be referred to the State Department of Health for formal approval before detail plans are made.

This procedure would insure against delay and unnecessary expense in the prosecution of the work.

Respectfully submitted,

H. B. CLEVELAND,
Assistant Sanitary Engineer

ALBANY, N. Y., *August* 29, 1906.

MR. A. E. COOLEY, *Village President, Canandaigua, N. Y.:*

DEAR SIR:— Again referring to the matter of purifying the sewage from your village I enclose herewith report of Mr. H. B. Cleveland, assistant sanitary engineer of this Department.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

CANISTEO RIVER

STATE OF NEW YORK — EXECUTIVE CHAMBER,

ALBANY, *July* 24, 1905.

HON. EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— Enclosed please find a petition dated July 13th, signed by L. Riddell and G. L. Preston, health officers of the town and village of Canisteo, for your consideration.

Yours truly,

FRANK W. HIGGINS

To His Excellency, Frank W. Higgins, Governor of the State of New York:

The petition of the undersigned, LeRoy Riddell, health officer of the town of Canisteo, Steuben county, N. Y., and George L. Preston, health officer of the village of Canisteo, same county and State, respectfully shows:

That heretofore and for several years past the city of Hornellsville, Steuben county, N. Y., has been and still is allowing the refuse of their sewers to pour out into the water of the Canisteo river, that said Canisteo river runs through the town and village of Canisteo, N. Y., and that said refuse matter pollutes the water of said Canisteo river to such an extent as to be injurious to life and health of the people living in the town and village of Canisteo, N. Y., and killing the fish in said river and injurious to cows that drink the water and give milk.

That the city of Hornellsville aforesaid has a dumping ground between the city of Hornellsville and the town of Canisteo, in the town of Hornellsville, on a low piece of land where they dump their garbage of all kinds; the cleanings of privy vaults and other refuse matter, is drawn there and dumped on top of the ground and every time during high water, which happens from two to four times a year, a good share of it is washed down the Canisteo river and lodged along the flats, and the high water floods the northwest portion of the village of Canisteo, around the houses and sometimes in the houses, where this refuse matter is lodged, which causes a foul stench and is injurious to life and health.

That a large number of complaints from the people of Canisteo town and village has been made to us of the above nuisances and we made a personal examination of the above on the 31st day of May, 1905, and found the nuisances existing as above set forth. That said nuisances are out of our jurisdiction as health officers as above stated.

Wherefore your petitioners pray that your Excellency may be pleased forthwith to require the State Board of Health to examine into said nuisances, and that said nuisances and the persons or body corporate having control thereof may be dealt with

according to law and that your petitioners may have such further or other relief as may be just and lawful in the premises.

Dated, Canisteo, N. Y., *July* 18, 1905.

L. RIDDELL,
Health Officer, Town of Canisteo

G. L. PRESTON,
Health Officer, Village of Canisteo

ALBANY, N. Y., *July* 29, 1905.

Hon. FRANK W. HIGGINS, *Governor of the State of New York, Albany, N. Y.:*

DEAR SIR:— I have the honor to acknowledge the receipt of your communication of the 24th inst., enclosing a communication from the authorities of the town and village of Canisteo for my consideration.

In reply you are informed that the complaint of the petitioners will be investigated by this Department with the least possible delay and I have detailed Prof. Landreth to such duty and upon receipt of his report a copy will be forwarded to you.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *July* 29, 1905.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

DEAR SIR:— I enclose herewith for investigation and report by you a complaint made by the health officers of the town and village of Canisteo concerning the alleged pollution of Canisteo river by reason of the discharge therein of sewage from the city of Hornellsville.

Kindly take up this matter at your earliest convenience and return the enclosed papers with your report.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

State of New York — Executive Chamber

To the Commissioner of Health:

I have been presented with a petition signed by L. Riddell, health officer of the town of Canisteo, Steuben county, and G. L. Preston, health officer of the village of Canisteo, Steuben county, alleging that the city of Hornellsville is allowing the refuse of its sewers to pour into the waters of the Canisteo river, which river runs through the town and village of Canisteo; and also that the city of Hornellsville maintains a dumping ground for garbage of all kinds, the cleanings of privy vaults and other refuse matter, between said city and the town of Canisteo, the accumulations of which find their way, several times during each year, into the waters of the Canisteo river, thereby creating a public nuisance and menace to the health and comfort of the people residing in the town and village of Canisteo, N. Y.

I, therefore, require you, in accordance with the provisions of section 6, of article 1, of the Public Health Law, to make an examination into the alleged nuisances and questions affecting the security of life and health in the locality aforesaid, and report the result thereof to me, on or before the first day of January, nineteen hundred and six.

Dated at the Capitol in the city of Albany this first day of December in the year of our Lord one thousand nine hundred and five.

FRANK W. HIGGINS

By the Governor:

Frank E. Perley, *Secretary to the Governor.*

A hearing in the matter was held September 7, 1905, and further hearing adjourned to October 19th and 20th, 1905.

On October 19th the attorneys for the two parties requested a postponement of further hearings until after the approaching terms of courts. Up to May 7, 1906, one party or the other had found it impossible to continue the hearings at each date proposed.

ALBANY, N. Y., *October* 17, 1906.

MR. WILLIAM H. NICHOLS, *Bath, N. Y.:*

DEAR SIR:— I have your communication of October 16th with reference to the case of Canisteo v. Hornellsville.

The Governor's order in this case required that report should be made to him on or before the first day of January, 1906. The case was adjourned, instead of being closed up before that time as it should have been, and when application was made to the Governor to have the time mentioned in the order extended, his counsel advised me that no valid extension of the time could be made.

I wrote Mr. Acker on July 25th, asking him to consult with you and advise me about what you desired to have done, and also wrote him again on September 12th to the same effect. He replied on September 13th that he had talked with you about the matter and that he was unable to state whether the proceedings would be dropped or whether they would institute new proceedings.

While the counsel for the Governor suggested that the investigation be completed and a report filed, it would seem to me that that would be a waste of time, as no action could be taken on the report, and that, if you desire to get any definite action in the case, it would be better to begin the proceeding over again. You could probably stipulate that the evidence which has already been taken should be received.

I wish you would advise me at once if it is thought best to take any further steps in this case as I wish to make a final disposition of the matter without delay.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *November* 14, 1906.

WILLIAM H. NICHOLS, Esq., *Bath, N. Y.:*

DEAR SIR:— Replying to your communication of November 9th regarding the case of the village of Canisteo against the city of Hornell, I note that you say that the Canisteo authorities desire to continue the proceeding.

In that event, I believe it will be necessary for a new petition

to be filed with the Governor and have a new order made by him, ordering an investigation by this Department. And I would suggest that you ask that the order give a sufficient length of time to close the case up before it is necessary for the report to be made by this Department to the Governor.

I would advise that you see Mr. Acker regarding this matter and ascertain how soon it will be possible to close this case up.

If the new order is granted, I shall expect that the evidence be put in without any delay, and the matter closed up immediately.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

TOWN OF GLENVILLE

ALBANY, N. Y., *October* 9, 1906.

EUGENE H. PORTER, M. D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In regard to the complaint of Mr. Charles L. Hardin, attorney for the board of health of Glenville, Schenectady county, in behalf of Mr. Edward Seeley who resides on the northwest bank of the Mohawk river below Schenectady, I beg to report as follows:

Mr. Seeley claims that the American Locomotive Works has built out an embankment into the river in such a manner as to deflect the sewage from one of the outfall sewers of Schenectady further out into the stream. He claims, as a result, that the sewage is brought nearer his property and creates a nuisance. The locality was visited and carefully inspected by one of our assistant engineers on September 7th and the conditions found to exist at that time were noted.

The sewage from Schenectady was formerly discharged into the Mohawk river at a point where the river is quite wide and where the bands do not extend out to the main river channel. At the present time the south bank has been filled in by the American Locomotive Works to near the channel and the Schenectady outfall sewer has been extended correspondingly further out — a distance of about forty feet. There was no indication, from the

inspection made, that the sewage from this outfall sewer has to any appreciable extent been deflected further out into the stream although theoretically this effect may have resulted.

That a nuisance exists in the river, however, there is no doubt. This is due to the discharge of the raw sewage into the river from the above described outfall sewer, the only remedy for which is a purification of the sewage of the city of Schenectady.

In view of the foregoing, I consider that any increase in the amount of sewage that reaches the property of Mr. Edward Seeley across the river below the Schenectady outfall sewer, due to the construction of the embankment by the American Locomotive Works is *inappreciable*, and that consequently the complaint against the Locomotive Works is in this respect, unfounded. It should be stated incidentally, however, that there is a considerable pollution of the Mohawk river at this point caused by the discharge of raw sewage from the city of Schenectady and that this pollution creates a nuisance and menace to the property of Mr. Edward Seeley. When a purification works for the sewage of Schenectady are completed — a matter that will be taken up in the early future with the general question of the pollution of the Mohawk watershed — the source of trouble complained of by Mr. Hardin will be removed.

Respectfully submitted,

THEODORE HORTON,

Consulting Engineer

ONEIDA

ONEIDA, N. Y., *July* 19, 1906.

State Department of Health, Albany, N. Y.:

GENTLEMEN:— I am daily besieged by complaints of the filthy and unsanitary condition of the State feeder running through this city. The complaints are all just, but I am unable to remedy them, and come to you for help in the matter. Please give this your immediate attention, as we certainly will have some serious epidemic, if something is not done right away.

Very sincerely yours,

AMOS P. DODGE,

Health Officer

ALBANY, N. Y., *August* 3, 1906.

EUGENE H. PORTER, M. D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In compliance with instructions received from this Department to make an investigation of the alleged unsanitary conditions of the "State feeder" running through the city of Oneida, I visited Oneida on the 27th ult., and found the conditions as follows:

The source of the feeder is Oneida creek, the waters of the creek entering the feeder near Oneida Castle, about twenty rods north of the West Shore Railroad Station, and flowing northerly through the city of Oneida and emptying at the dry dock west of the village of Durhamville, being two and one-half miles long. It is about twenty feet wide, and the depth of the water from intake to point in city where clogged up varies from four to two feet. Where the stream comes out on the north side of the New York Central tracks it is but about ten feet wide and shallow.

While the stream is supposed to be a feeder for the Erie canal, it appears that at present it is not of much use for that purpose, owing to its having been used as a receptacle for garbage and other waste matter within the city limits of Oneida, which has accumulated at a point where the feeder runs under the stores in the business section of the city, thus choking it up, and a large portion of the water at time of inspection passed through the mill race which leads from the feeder in the rear of the buildings facing Madison and Phelps streets.

It was the practice of the State Superintendent of Public Works to have the bed of the feeder cleaned out every spring before the opening of the canal season, and the eel grass cut during the summer months, thus keeping the stream in good condition; but I was informed that the general cleaning out of the stream had been abandoned five or six years ago and, since that time, it has been gradually filled in with rubbish until conditions prevail as stated above.

The city board of health has caused the owners of buildings adjoining and located over the feeder to connect their sewers with the city sewer system, but there may be a few open closets over the stream which are used in violation of the city ordinances.

The condition of the feeder from the intake to the business

center of the city is in fairly good condition, whatever offensive matter is therein being almost wholly made up of eel grass. Dead grass has floated down the stream and become lodged with the garbage and waste matter thrown into the stream in the rear of the stores and the odors therefrom are most offensive.

Dr. A. P. Dodge, the city health officer, informed me that the city authorities had been active in trying to prevent the dumping of garbage or waste matter into the feeder, and that the present unsanitary conditions were due largely to the authorities having charge of the State canal failing to take the proper measures in keeping the channel of the feeder properly cleaned out and the flow of water what it should be to answer the purpose for which the stream is intended; and that, should the State clean out the feeder, the city would try to see that the stream was kept entirely free from sewage or garbage.

Present conditions are certainly a menace to public health and I would recommend:

That the matter be taken up with the superintendent of public works with a view of obtaining some joint action on the part of the State and city officials which will result in the feeder being thoroughly cleaned out and kept free from such unsanitary conditions as exist at present.

Respectfully submitted,
F. D. BEAGLE,
Chief Clerk

ALBANY, N. Y., *August* 7, 1906.

HON. NICHOLAS V. V. FRANCHOT, *State Superintendent of Public Works, Albany, N. Y.:*

DEAR SIR:— Complaint having been made to this Department as to the unsanitary conditions of the State feeder in the city of Oneida, I directed that an investigation should be made of the same, and herewith enclose for your information a copy of the report covering said investigation.

I hope you may see your way clear to take such action as will remedy existing conditions.

Very respectfully,
EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *August* 8, 1906.

Dr. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— Your letter of yesterday's date transmitting a copy of report made by your inspector in the matter of the condition of the Oneida feeder, Oneida, N. Y., has been received. An investigation will be made by this department, not only as to the conditions complained of and as set forth in your inspector's report, but also consideration will be given to the matter as to what extent the State is responsible for the present condition, and, therefore, obligated to remedy the existing condition.

One of the sources of the present difficulty is that the inhabitants of Oneida individually, and the city officially, have in years past made use of this feeder for sewage purposes. Some three years since the department conducted warfare against the further and continued use of the feeder as a sewer, and went so far as to cut off by the use of wooden plugs a large number of drains emptying into the feeder.

On several occasions bills have been introduced in the Legislature, providing for the deepening of the feeder, and for converting it into a brick culvert at certain points, the aim being, as this department believed, to officially convert the feeder into an outlet sewer. The department has opposed all such legislation.

I refer to these matters in order that you may know the real conditions so far as there may be a controversy between this department and the city officials of Oneida. The superintendent directs me to advise you that he will not omit to perform any duty in the premises which may legally and morally devolve upon the State in connection with abating the existing nuisance, nor, on the other hand, will he feel warranted, merely because the feeder is the property of the State, in ridding the city of Oneida of a nuisance which is self-created, and which has resulted by a disregard of the department's orders against the improper use of the feeder.

Yours very truly,

WINSLOW M. MEAD,

Deputy Superintendent of Public Works

PLATTSBURGH

PLATTSBURGH, N. Y., *November* 14, 1906.

State Department of Health, Albany, N. Y.:

GENTLEMEN:— In compliance with the directions of the board of public works and the board of health of this city, I complain to your Department in behalf of the city of Plattsburgh of the action of certain pulp companies along the Saranac river in this county, in diverting the waters of this river. The company that is chiefly at fault is the International Pulp and Paper Company, in their mill at Cadyville, ten miles west of this city. The conditions here are serious. The river runs through this city, and the sewers of the city empty into it, near the mouth of the river, and the water has been so low for several weeks, that the mouths of the sewers are above water, and the sewage is thus emptied above the water, and is not carried away. The condition is horrible. Winter is coming on and our sewers will be frozen under a large part of the city. Now these mills are not within the municipality, and not, therefore, under the jurisdiction of our local board.

I would like to have the State Department make an investigation of this matter, at the very earliest opportunity and take up the matter with the Attorney-General and have this condition remedied.

While I have not made a very thorough investigation as to the law, it would seem to me as follows: The Saranac river has been declared by statute to be a public highway; the action of this paper company interferes therefore with the public right of navigation, and the proper party to bring suit to restrain this interference is the State, as in the case of the People against Vanderbilt, 26 N. Y. 287. The State might bring action to restrain this company, on the ground that their dam is too large for the stream, and interferes with the public right of navigation, and further interferes with and creates a condition in the city of Plattsburgh injurious to the public health.

What I would like to convince your Department is, that the condition is serious and demands immediate attention, to protect the health of the people of this city. I would be pleased to meet

your Department and the Attorney-General, and co-operate in remedying this dangerous condition.

Very truly yours,

ARTHUR S. HOGUE,
Corporation Counsel

ALBANY, N. Y., *December* 3, 1906.

EUGENE H. PORTER, M. D., *State Commissioner of Health, New York City:*

DEAR DOCTOR:— In compliance with your instructions on November 23d and 24th, 1906, I investigated the complaint of the board of public works and the board of health in the city of Plattsburgh on the action of certain pulp companies along the Saranac river in diverting the waters of the river.

The complaint of the board of public works and of the board of health was made through the corporation counsel of the city, and you will no doubt remember that you have already had some correspondence regarding this matter with Dr. J. H. LaRocque, the health officer of the city.

The Saranac river runs directly through the center of the city and the sewage of the city is discharged into the river at a number of different points within the city limits. But a short distance below the city the river flows into Lake Champlain.

I am reliably advised that the International Pulp and Paper Company have a mill at Cadyville, about ten miles west of the city. They have built a very large dam there of concrete and in storing the water for the purposes of power they practically stop the entire flow of the river for hours at a time. The result is that the bed of the river through the city of Plattsburgh is dry and the sewage from the city sewage system is discharged directly onto the bed of the stream, as a result of which a very unsanitary condition is apt to ensue.

With a fair amount of water in the stream, the mouths of the sewers are entirely covered, as they extend out into the bed of the river.

It is the opinion of the corporation counsel that the Saranac river having been declared to be a public highway is under the con-

trol of the State authorities and that an action regulating this matter should be begun by the attorney-general.

The International Pulp and Paper Company should be compelled to allow sufficient water to flow down the stream at all times to afford sufficient dilution for the sewage discharged and to carry it away.

It does not appear to be a matter in which this Department has sufficient authority to take any preemptory action but I recommend:

That the International Pulp and Paper Company be advised that, unless they allow sufficient water to pass over their dam to avoid any nuisance in the city of Plattsburgh, the case will be placed in the hands of the attorney-general for action by him.

Very respectfully,

A. H. SEYMOUR,
Secretary

ALBANY, N. Y., *December* 8, 1906.

International Pulp and Paper Company, 30 *Broad street, New York City:*

GENTLEMEN:— This Department is in receipt of complaints from the board of public works and the board of health of the city of Plattsburgh as to the action of your company in operating a mill at Cadyville, several miles west of the city of Plattsburgh.

It is alleged by the complainants that you have built a large dam at Cadyville and that, in storing water for the purpose of power, it frequently happens that you stop the entire flow of the Saranac river, as a result of which the bed of the river is dry and the sewage from the sewage system of the city is discharged directly onto the bed of the stream; consequently, a nuisance is created and a very unsanitary condition detrimental to the health of the people of Plattsburgh.

I have investigated these complaints and find the facts to be practically as stated to me and I wish you would advise me at once as to whether or not it would not be possible for your company to allow sufficient water to pass over your dam at all times to afford sufficient dilution for the sewage discharged from the city and to carry it away.

The authorities of the city of Plattsburgh believe this case should be placed in the hands of the attorney-general for action by him but, before doing so, I believe it would be well to take the matter up with you and see what you have to say regarding it. Will you kindly advise me with as little delay as possible as to what your attitude is in the matter in order that I may govern future action of the Department accordingly?

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

ALBANY, N. Y., *December* 11, 1906.

EUGENE H. PORTER, Esq., *Commissioner, State Department of Health, Albany, N. Y.:*

DEAR SIR:— Your favor of the 8th is at hand and we thank you for your very courteous manner of calling our attention to the complaint lodged with you by the board of public works and the board of health of the city of Plattsburgh as to the alleged interference by us with the flow of the Saranac river.

We have recently been assured by our local manager that there has been no abrupt stoppage of the flow, but, on the contrary, when our mill has been down on Sunday, it has been his custom to allow a good quantity of water to pass out of our storage pond and go to waste over our other dams below.

You state that you have investigated this matter and find the facts to be practically as alleged. If you have any definite data we would be very glad if you would place it before us, as our sole object is to get at the facts. We would not permit such interference with the flow of the stream as is alleged and I cannot see how it has occurred in view of the statement of our superintendent.

There are, as you know, a number of dams below us, and it occurs to us that the owners may be in the habit of drawing their ponds down Saturday night and filling them up on Sunday. However, this is only a surmise and we will take immediate steps to investigate our own actions, and, as stated above, if you can furnish us with specific information we would be glad to have it.

Very truly yours,

CHESTER W. LYMAN,

Assistant to President

ALBANY, N. Y., *December* 20, 1906.

J. H. LAROCQUE, M.D., *Health Officer, Plattsburgh, N. Y.:*

MY DEAR DOCTOR:— I enclose you herewith a copy of the letter from the International Paper Company regarding the matter of the Saranac river, complaint about which was recently investigated. You will note that they say that they have been notified that there has been no abrupt stoppage of the flow, but, on the contrary when their mill has been down on Sunday, it has been their custom to allow a good quantity of the water to pass out of their storage pond. You will also note their promise to remedy the conditions; and I am anxious to know if they make any attempt to do so.

Will you kindly lay this communication before the mayor and the corporation counsel, whom I had the pleasure of meeting while in Plattsburgh, and assure them that I will be very glad to take this matter up further?

I wish to know if the same conditions continue in the future and wish you gentlemen would keep your eyes on the situation for a few weeks, at the end of which time, if the conditions have not been remedied, will you kindly advise me specifying, as nearly as possible, the dates and duration of time during which the flow was stopped so that the sewage lay on the bed of the river.

If the conditions do not change, the matter will be taken up further and, if necessary, the facts will be placed in the hands of the attorney-general.

Very truly yours,

A. H. SEYMOUR,

Secretary

SPRINGVILLE

SPRINGVILLE, N. Y., *July* 9, 1906.

State Board of Health:

SIRS:— My home is on Waverly street and I have lived there for thirteen years. My lot joins C. H. Albro's.

There is a small brook running through said lot. Part of the time the brook bed is dry.

For the last eight years there has been a sewer emptying into the brook outside of the walk in the brook. There is not enough water to wash away the impurities. We protested against it, and too much influence has been against us.

There has been a complaint made yearly to the board of health and they have passed it over for the same reason they have allowed it to be put in. Now I apply to you for relief.

Yours respectfully,

JOHN JUVELLER

What has been said is so, but we cannot help ourselves.

C. H. ALBRO,

Member Board of Health

SPRINGVILLE, N. Y., *August* 17, 1906.

DR. EUGENE H. PORTER, *Commissioner, New York State Department of Health, Albany, N. Y.:*

DEAR SIR:— In regard to the complaint of C. H. Albro of Springville, N. Y., which was referred to me for investigation I report as follows:

In company with D. M. N. Brooks, the local health officer, I investigated the alleged nuisance and interviewed the complainant and the parties said to be responsible for maintaining the same.

The village of Springville has no general sewer system. The sewer complained of is a short section of tile drain at the western end of the village. It starts at the flour mill of George Chesbro on the north side of Main street, runs across Main street then between two lots on the south side of that street, in the rear of those lots it turns in a southeasterly direction and crosses Waverly street which intersects Main street at about right angles a little to the east of the mill. This tile is carried across Waverly street through a stone culvert and opens into a deep gully on C. H. Albro's land near the east side of Waverly street.

This section of tile sewer was originally built to carry surface water and water from the municipal water works mains after the latter was used to cool a large gas engine which furnishes power for the flour mill. This latter contains a trace of the lubricating oil used upon the engine. The sewer conducts the water in the direction it would naturally take if left as a natural water course.

The trouble originated by the mill owner, the Pan-American hotel just to the west of the mill and two or three private residences in the vicinity connecting their water-closets with this sewer

thereby causing a nuisance upon Mr. Albro's property, at the sewer opening, which the local board of health would from time to time call upon him to abate.

When complaints would be raised about the matter the persons having closets connected with the sewer would discontinue their use for a while but after the matter was dropped would again open the closets for use.

Mr. Albro now wants the closets disconnected with this sewer and the sewer outlet removed from his land. The parties owning the closets have now agreed to disconnect them and the health officer says that he will see that this done. Mr. Chesbro, owner of the mill, will, if required, stop the tile sewer on the other side of Waverly street before it enters Mr. Albro's land. The water from it would naturally find its way to the gully on Mr. Albro's land even then.

It appears that Mr. Albro never gave permission for the tile to be extended onto his land, but he made no complaint regarding it as long as no closet sewage was conducted through it and no trouble made by the board of health for him on account of the resulting nuisance upon his property.

The disconnection of the closets with this sewer will in my opinion abate the nuisance as far as the public health authorities are concerned. The question of the right of Mr. Chesbro to drain the water from his engine over Mr. Albro's land would seem to be a matter to be arranged for or litigated about by the parties concerned.

There is considerable talk in the village of constructing a sewer system and it is not at all unlikely that such will be built in the next few years.

Respectfully submitted,

JAMES H. MEEHAN,
Inspector

III(b). SYSTEMATIC EXAMINATION OF SOURCES OF STREAM POLLUTION BY WATERSHEDS WITHIN THE STATE

Investigations of stream pollution have up to the present time been usually made in response to special applications and have been limited to specific cases. Occasionally applications are received for a general investigation of the pollution of a stream or of the watershed by special request of local authorities or by request of the Governor in accordance with section 6, article I, of the Public Health Law.

The advantages of a systematic investigation of all watersheds in advance of specific complaints is so apparent as to need little emphasis. The knowledge of the sanitary conditions of all localities of the State should evidently be known and be a matter of record. The information collected should include not only the location of all sources of stream pollution but other data relating to sewerage systems, water supplies, the methods and efficiencies of the purification of each and other information of a general sanitary nature.

With a record of such statistics, which it is practicable to collect only by trained assistants who appreciate the value and the purpose for which the information is to be used, it will be possible to consider without delay plans for sewerage systems and applications for the discharge of sewage into the streams of the State — matters which now require hasty and incomplete sanitary surveys in each particular case before they can be passed upon, or in regard to which recommendations can be properly given.

Occasions have arisen for a general investigation of pollution of portions of watersheds of three streams in the State, viz.: the Hudson river between Troy and Glens Falls, including the Hoosick river, the Susquehanna river and the Oswego river. Advantage was taken of these opportunities to not only collect the necessary data for the purposes of the investigations but also to test the expediency and celerity of making such examinations and to study

the scope and amount of sanitary data which it would be practicable to secure with the limited services available for such work.

Of the three investigations above alluded to, the one relating to the Hudson river has been completed, but those relating to the Susquehanna river and the Oswego river have been only partially completed. It is expected that in the near future the exclusive time of one or possibly two assistants may be given to this work, and that the work on the Susquehanna and Oswego watersheds will soon be completed and work on other watersheds taken up.

DELAWARE RIVER

At the suggestion of the State Sewerage Commission of New Jersey, a conference was held on September 14, between the said commission, the Department of Health of New York State and the Department of Health of Pennsylvania.

The purpose of the conference was to outline means for preventing further pollution and of eliminating present pollution of the Delaware river.

The minutes of the conference follow:

Minutes of meeting at the Chalfont hotel in Atlantic City on September 14, 1906, between officers of the State Sewerage Commission of New Jersey, the Department of Health of New York State and the Department of Health of Pennsylvania.

There were present: Col. Chas. W. Fuller, Chairman, and Mr. Harry M. Herbert, member of the State Sewerage Commission of New Jersey; Dr. Eugene H. Porter, Commissioner of Health, Theodore Horton, Chief Engineer, and A. H. Seymour, Secretary of the State Department of Health of New York and Hon. Samuel G. Dixon, Commissioner of Health, F. Herbert Snow, Chief Engineer and Wilbur Morse, Secretary to the Commissioner of the State Health Department of Pennsylvania.

Colonel Fuller was chosen Chairman of the meeting and Mr. Morse, Secretary.

The Chairman, for the purpose of setting before the meeting what had been done in the State of New Jersey, submitted the following statement:

"The State Sewerage Commission since its creation in 1899 has pursued a uniform policy of requiring purification in all cases of installation of sewerage systems in the Delaware valley.

There are now plants at the following places: Newton, Burlington, Moorestown, New Lisbon, Collingswood, Haddonfield, Asyla, Woodstown and Vineland.

"Permission to discharge sewage until purification be required has been granted to Millville, Woodbury and Bordentown. Of these, notice has already been sent to Millville that purification will be required in the immediate future. A plant is now being constructed at Merchantville on the installation of a new system.

"In addition to these places there are from forty to forty-five places in New Jersey in the Delaware watershed which are present sources of pollution of the Delaware river.

"The State Sewerage Commission is at the present time conducting a sanitary inspection of all of these places. This inspection has been started very recently and complete reports have been made in only six instances. In four of these, notice has been given to show cause why purification should not be required in the municipality, and in the other two (there being no sewers but other sources of pollution) requests have been sent to the local authorities to abate such nuisances as to exist. This sanitary inspection will proceed throughout the valley, and such action will be taken by the Commission in each case as may seem proper after receiving the reports. The continuation of this course of action by the Commission will result in the stopping of all pollution in New Jersey and the purification of the sewage discharged from all systems in the Delaware watershed.

"The Commission, for the purpose of reporting to the Legislature of 1907, is collecting statistics, consisting first, of the sanitary inspections above referred to; secondly, all statistics of water supplies, population, sources and kinds of pollution, areas, etc., in accordance with a resolution adopted a few weeks ago, copies of which have been sent to the State Health Departments of Pennsylvania and New York.

"This Commission is desirous of securing the collection of similar statistics in the States of Pennsylvania and New York during the present fall. Its statistics will be at the service of the State Health Departments of Pennsylvania and New York, and it desires the use of similar statistics from these Departments. It also is in favor of a uniform policy similar to its present policy on the parts of these Departments for the purpose of removing the

present pollution and preventing the future pollution of the Delaware river in all three states, by the requirement of satisfactory purification of the discharge of all sewerage systems, and the removal from the river or its branches of all other sources of pollution or nuisance.

"Of the forty or forty-five sources of pollution referred to above, the amount of the pollution is serious in the following cases: Philipsburg, Trenton, Bordentown, Riverton, Camden, Gloucester, Woodbury, Salem, Bridgeton and Millville. In the other cases, the amount of pollution is small. Of these more important cases, if any provision is made for the disposal of the sewage of Philadelphia, it would be possible, by the creation of a Metropolitan district, to include Camden and Gloucester and some adjacent territory. In the other cases, small purification plants would suffice, except for Trenton, where a larger plant would be necessary."

After a full and free discussion of the subject of co-operation and practicable way of going at the subject, it was agreed that each State should collect statistics similar to those being collected by the State of New Jersey with respect to the Delaware river watershed within each State and furnish copies of the same to the other two States within the said drainage area.

It was also agreed that the policy of each State shall be to clean up the sources of pollution and to require the treatment of sewage at as early a date as possible. It was further agreed that the interests of the public health demand that where the source of water supply is taken from a stream into which sewage is discharged, treated or untreated, above the water works intake, that the public or private corporations taking such water shall be required to filter it in order to maintain constancy of potability and purity of the water supplied to the people for drinking purposes.

WILBUR MORSE,
Secretary

This matter has been taken up by this Department and when funds have been provided, a careful sanitary survey and inspection of the Delaware river watershed within this State will be made.

III(c). PREPARATION OF STATE SANITARY MAP SHOWING SOURCES OF WATER SUPPLIES AND OF STREAM POLLUTION

Emphasis was given in preceding paragraphs with reference to the importance of systematic collection of data, relating to stream pollution, and the collection of other statistics relating to water supplies and sewerage systems in the State.

The proper recording of such information is a matter of considerable importance and its value depends upon the readiness or condition in which it is available. The idea of a State sanitary map on which these statistics and information are graphically and symbolically recorded is not a new one and in the last report of the Commissioner of Health especial attention was called to it. Such a map or set of maps, prepared for instance from the topographical sheets of the United States Geological Survey, will be an invaluable aid to the bureau in the study of water supply and sewage disposal problems.

The preparation of such a map has already been begun and the work of transferring the information collected during field investigations has been taken up conjointly with it.

IV.

INVESTIGATIONS OF PUBLIC NUISANCES NOT ARISING FROM STREAM POLLUTION

IV. INVESTIGATIONS OF PUBLIC NUISANCES NOT ARISING FROM STREAM POLLUTION

COLONIE

Slaughter-House Pollution, West Albany, N. Y.

SCHENECTADY, N. Y., *April* 24, 1906.

EUGENE H. PORTER, M.D., *Commissioner, State Department of Health:*

DEAR SIR:— In accordance with instructions received from you on April 23d, I visited on that day the premises referred to in the enclosed complaint of Hannah Espenlaub.

The stream in question is a branch of Patroon's creek, and flows southward through West Albany, under the tracks and yards of the New York Central, and thence with Patroon's creek as a covered sewer to the Hudson river. About a third of a mile up this stream from the railroad are the premises of Hannah Espenlaub, consisting of a combined dwelling and public house — situated directly by the bank of the stream. A quarter of a mile further upstream is the outfall of the wooden box sewer which drains the slaughter-house and ice pond and two dwellings on the property of Bennett Brothers. This outfall is about 500 feet downstream from the spillway of the West Albany reservoir, and is the first source of pollution which the brook encounters. Between this outfall and the premises of the complainant there discharges into the brook a little surface stream, said to come from a spring, which carries with it the household waste and barn-yard drainage of the premises said to belong to John Glavin.

This cannot be regarded as a serious nuisance, as the quantity is small. These two are the only visible sources of pollution affecting the brook above the premises of Mrs. Espenlaub. She, and several others below her, maintain privies on the bank of the creek.

The stream at the time of inspection was flowing quite rapidly, averaging 3 feet in width and 6 inches in depth. At the tracks of the New York Central it was visibly pink in color, and going up the stream the redness darkened; at frequent intervals the odor was strong, resembling that of spoiled meat. In many places there had collected a scum which resembled that on the surface of slow-flowing sewage, and which was most disagreeable. This scum it is alleged comes from the discharged scalding water used for removing dirt and bristles from slaughtered hogs.

As the outfall was approached, the stream flowed quite rapidly, but each pool was colored so deeply with blood that it can truly be described as blood color. The liquid pouring out of the outfall was at that time clear but deep pink in color. The day was cool, and at this point the odor was not marked.

The sewer is about 600 feet in length and has a rapid fall; the slaughter-house, dwellings and ice pond being at a considerably higher level than the brook. The pond is artificial and is usually kept full, being occasionally emptied through said sewer into the brook.

All liquid wastes are alleged to be discharged through this sewer. I was told by an employee within the slaughter-house that all blood was fed to the hogs, but it was seen in the brook yesterday by me.

The average weekly "duty" of the slaughter-house is six carloads of beef, calves or hogs, as the demand exists. Liquid wastes are or may be detained on the premises in a detention tank for a week or more; and it is alleged that on occasions of former complaints, the wastes have been so detained and discharged subsequently (often at night) suddenly, without warning, and in a far more foul and nauseating condition than when discharged fresh.

The slaughter-house is of necessity attended with unpleasant sights and odors, but the premises themselves seemed to me to be needlessly foul and unclean.

The present condition is unquestionably a nuisance and a menace. The remedies may be numerous, but the ones which naturally suggest themselves to me are: (1) Discharging all liquid wastes by sewer as at present, transforming the brook into a covered sewer from the outfall of the slaughter-house sewer to

Patroon's creek, a distance of probably two-thirds of a mile. (2) Suitable means of disposal (cremation, or distribution upon soil) upon the premises of the firm.

Respectfully submitted,

ERIC T. KING.

Inspecting Engineer on Water Supply

Albany, N. Y., *May* 1, 1906.

Dr. H. C. Abrams, *Health Officer, town of Colonie, Newtonville, N. Y.:*

Dear Sir:— Your attention is again called to the discharge of sewage at West Albany by the Bennett Brothers, regarding which we have had some correspondence before.

Your attention is called to the fact that this discharge is in direct violation of section 75 of the Public Health Law, and it is the duty of your board to take some action in this matter immediately.

I have had an inspection of the premises maintained and am familiar with the conditions and I desire that you call the matter to the attention of your board of health, in order that they may serve notice on the Bennett Brothers forthwith.

Unless the conditions are remedied without delay I shall be forced to take action against these parties myself under the provisions of law provided by the statute.

Please advise me at once as to whether or not your board will act in this matter.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

Newtonville, N. Y., *June* 28, 1906.

State Department of Health:

Dear Sir:— Your letter of the 27th received, in reply would say the Bennett Brothers no longer sewer in the Patroon creek; they have built a sediment basin which proves satisfactory to all, and we consider the nuisance abated.

H. A. ABRAMS, M. D.

TOWN OF GREENBURGH, WESTCHESTER COUNTY

Lander Fat and Bone Refinery

In response to requests from the board of health of the town of Greenburgh, Westchester county, and from a citizen of that town, an inspection was made of a fat and bone rendering establishment located near Elmsford.

Recommendations were made by the department regarding desirable improvements which should be made to the plant and in respect to its proper operation with a view toward placing it in a sanitary condition.

HAGUE

ALBANY, N. Y., *September* 28, 1906.

The President, Board of Health, Hague, N. Y.:

DEAR SIR:— This Department has been in receipt of numerous complaints regarding unsanitary conditions of the creek flowing through Hague and it was finally decided to send an inspector there to go over the situation. The report of the inspector is now before me. He advises me that the board of health seldom meets and that but little attention is paid to questions of health and cleanliness in your village. It is unnecessary for me to bring to your attention the condition of the creek as you are no doubt already familiar with it. I desire, however, to call your attention to the cesspools constructed so near the creek and the lake that the seepage finds its way into the water. Your board of health should meet and adopt a set of sanitary regulations. It should adopt an ordinance to provide for anyone who threw any refuse into the stream and post notices to that effect. It should also adopt an ordinance providing that no cesspools shall be constructed except in a manner and in a location to be approved by it.

From the complaints that have been received here it is very apparent that quite a number of the residents of your village are very much dissatisfied with the sanitary conditions of the village and I trust that it is unnecessary for me to urge upon you as president of the board of health the duty which the law imposes upon you.

I will be glad to render you any assistance in this matter in the formulating of proper necessary ordinances or in advising

you of the way to handle the situation. Kindly let me hear from you.

Respectfully yours,

EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *November* 14, 1906.

Mr. ELLIS BOLTON, *President Board of Health, Hague, N. Y.:*

DEAR SIR:— On September 28, 1906, I wrote you advising you of the report of our inspector, calling your attention to the unsanitary conditions found to exist in your village.

I have not received a reply to that letter, kindly let me hear from you at once.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

HAGUE, N. Y., *November* 26, 1906.

EUGENE H. PORTER, *Commissioner of Health:*

DEAR SIR.— Yours of the 14th at hand. I was away from home until the 24th. In reply will say we met as a board of health immediately after your inspector was here and authorized or requested our Dr. M. H. Turner, of Ticonderoga, to investigate the conditions in our town and to report the same to us.

We also had printed the following rules and regulations, which were acted upon at said meeting, and we are ready as a board of health to take any action which Mr. Turner or yourselves see fit to do.

If there is any more for us to do kindly let me know.

Yours respectfully,

ELLIS BOLTON,
President Board of Health

Rules and Regulations of the Board of Health, Hague, N. Y.

1. *Nuisances defined.*— Whatever is dangerous to human life or health; whatever building, or part of cellar thereof, is overcrowded or not provided with adequate means of ingress and

egress, or is not sufficiently supported, ventilated, sewered, drained, lighted or cleaned; and whatever renders soil, air, water or food impure or unwholesome, is declared to be nuisances and to be illegal; and every person having aided in creating or contributing to the same, or who may support, continue or retain any of them, shall be deemed guilty of a violation of this ordinance, and shall also be liable for the expense of the abatement or remedy required.

2. *Privies, cesspools, etc.*— No privy-pit, cesspool or reservoir into which any privy, water closet, stable, sink, or other receptacle of refuse or sewage is drained, shall be constructed or maintained in any situation or in any manner whereby, through leakage or overflow of its contents, it may cause pollution of the soil near or about habitations, or of any well, spring, or other source of water used for drinking or culinary purposes; nor shall the overflow from any such reservoir or receptacle be permitted to discharge into any public place or in anywise whereby danger to health may be caused; and every such pit, reservoir, or receptacle shall be cleaned and the contents thereof removed at such times and under such precautions as the board of health may prescribe. Violations of any of the provisions of this ordinance shall subject the offending party to a penalty of $1 for each day's continuance of the nuisance after due notice to abate it from an authorized officer.

ALBANY, N. Y., *December* 4, 1906.

MR. ELLIS BOLTON, *President Board of Health, Hague, N. Y.:*

DEAR SIR:— I am in receipt of your letter of the 26th ult., enclosing copy of ordinances adopted by your local board of health, defining nuisances and regulating the construction and location of privies, cesspools, etc., in your town, so as to prevent a nuisance or the pollution of the public waters of the State.

You should see that the provisions of these ordinances are carried out to the letter.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

HAGUE, N. Y., *December* 17, 1906.

DR. ALVAH H. DOTY, *Health Officer of New York:*

DEAR SIR:— I am one of four justices of the peace of this town, Hague. Our town board and Dr. M. H. Turner, of Ticonderoga, constitute our town board of health.

At the present time we seem to be in an alarmingly unsanitary condition which our local board seems incompetent to deal with.

On the 9th instant Ed. Shattuck, seemingly a strong, vigorous young man, died of typhoid fever after about one week in his bed.

On the 10th instant Ellis Bolton, supervisor of the town, apparently an exceptionally strong man of about 35 years, died of typhoid fever after about a week's illness.

Mrs. Melvin Barton, wife of one of our justices of the peace, is still confined to her bed after a very severe attack of typhoid, from which it was thought ten days ago she could not recover.

Her illness followed that of a son, from the same fever, but he has recovered.

There were several cases of typhoid two or three months ago which did not prove fatal, but were alarming enough to show the necessity for some official action.

The town board met October 1st and authorized and requested Dr. Turner to make an inspection of sanitary conditions and report with recommendations. Supervisor Bolton (now dead) was authorized to have some notices printed and put up. I suppose that was done. I have never seen one of the notices and if anything else was done I have not known of it.

I am aware that an officer from your Department was here and made an inspection in September and the effect seems to have been a little flurry of action which amounted to nothing. Nobody has the courage to do what should be done for fear of giving offense.

Through Hague Center, where these unsanitary conditions seem to be the worst, runs the Hague brook into Lake George. On the banks of this brook there are privies and manure heaps quite near and the grade of the land makes it inevitable that there should be both surface drainage and through filtration into the brook.

I have been told that some of the privies have not been emptied in three years.

What we plainly need is some authority strong enough and courageous enough to order a *thorough clean up and see that it is done.* * * * .

But I don't want to make suggestions. I want to get them and I ask you most earnestly will you advise me what is best to be done.

The urgency and seriousness of the case is my excuse for so long a letter.

Truly yours,

JOHN J. WILSON

ALBANY, N. Y., *December* 23, 1906.

MR. JOHN J. WILSON, *Hague, N. Y.:*

DEAR SIR:—Your communication of December 17th, which was sent to Dr. Doty, the health officer of the Port of New York, has been referred to this office.

I have read your communication with interest and fully agree with you that active and effective steps should be taken at once to remedy the sanitary conditions existing in Hague.

During the last summer, this Department received complaints about the conditions of the stream flowing through the village and it was finally decided to send an inspector there to go over the situation. The inspector made a report and thereupon I wrote the president of the board of health, laying the facts in the case before him and advising him that under the law the duty of remedying the seemingly unsanitary conditions rested entirely with the local board of health.

This Department is without authority to interfere unless, in its judgment, there is danger of the spread of contagious disease beyond the borders of the town.

The situation is one in which the people should be thoroughly aroused to the importance of improving the sanitary conditions of the village and they should urge and insist that the local board of health do its entire duty in the matter.

I advised the president of the board of health that the board should adopt a set of sanitary regulations covering the local conditions, and that it should adopt an ordinance forbidding anyone to throw any refuse into the stream, and post notices to that effect

It should also cover the construction and location of cesspools and sewers.

If this Department had the authority, which I think it should have, to step in and order your local board of health to take certain steps in this matter, I would be very glad to exercise such authority; but unfortunately, as the Public Health Law exists in this State to-day, I do not seem to have that power.

I am deeply interested in the situation and wish you would lay this communication before the new president of your board of health and urge upon him the importance of getting the board together and taking prompt steps to clean up the village and improve the sanitary conditions. Unless this is done, it is very possible that you may have an epidemic of typhoid fever, the blame for which can hardly help but fall upon your board of health.

I shall be glad to hear from you further about this matter, and assure you that I stand ready at any time to render you any assistance, either in the preparation of a set of sanitary regulations or in advising the board as to what action had better be taken.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

HUDSON VALLEY RAILWAY

ALBANY, N. Y., *December* 18, 1906.

State Railroad Commission, Albany, N. Y.:

GENTLEMEN:— I wish to enter a complaint against the condition of the cars on the Hudson Valley Railway Company between Troy and Warrensburg.

Several complaints, verbal and written, have been received at this Department regarding the condition of these cars and a thorough inspection has been made by the Department, and a copy of the report of our inspector is herewith enclosed.

As the report shows, the cars are in a very filthy condition, apparently never cleaned. No notices are posted forbidding spitting on the floor and apparently no attempts are made to keep these cars in a sanitary condition.

The subject of proper car sanitation is one which, in my judgment, is very important, and it at present is receiving a large amount of attention by the various State Boards of Health of this country. The large number of persons conveyed on the steam and electric lines of this State renders it imperative that every effort should be made by the companies operating those roads to see that the cars are kept in a proper condition. Otherwise, they are a prolific cause of disease.

I, therefore, appeal to your honorable board, in behalf of the citizens who are obliged to use these cars, against allowing them to remain in the filthy and unsanitary condition in which they are at present.

Some of the details of the report are so disgusting as to render further comment unnecessary and I sincerely hope that your body may take prompt action in this matter, which I assure you will be thoroughly appreciated by the people who are obliged to use these cars for transportation.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *December* 26, 1906.

EUGENE H. PORTER, M. D., *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR:— Enclosed herewith you will find a copy of a report, dated the 22d instant, of an inspector of this board as to the condition of the passenger cars of the Hudson Valley Railway, in the matter of your complaint.

Very truly yours,

J. R. KENNEDY,
Secretary

Case 3865.

COMPLAINT

In Matter of Complaint of EUGENE H. PORTER, State Commissioner of Health, against the HUDSON VALLEY RAILWAY COMPANY, as to the filthy and unsanitary condition of that company's cars.

To the Honorable Board of Railroad Commissioners, Albany, N. Y.:

In answer to your letter of December 18, 1906, I have made an inspection of the Hudson Valley Railway and its cars. The following is in relation to the complaint:

The cars of this road are made by J. M. Jones, West Troy, and are of two styles — small single truck cars, seating 22, side bench seats, cane upholstered, Westinghouse 49, 4 motors, 40 horse-power each, equal 160 horse-power each car; large double track, 36-inch steel wheel, air-brakes, single chain hand-brake, double lever, Baker steam heaters, combination coach and smoker, smokers side and cross seats seat 40, upholstered with cane and imitation leather, electric lights, power Westinghouse 56, 60 horse-power, double motor each truck, which is 4 motors to each car, 60 horse-power each, equal 240 horse-power, double or high gear for 55 miles per hour. In service after dark all cars use oil headlights and red lights in the rear.

Sanitary condition

Indications show, and I hear from other sources, that the previous condition of these cars has not been what it should have been. On Thursday, December 20, 1906, between 7:15 and 9:30 p. m., I inspected the following cars of this company at Glens Falls while in service. The night was very stormy and wet, which made the floors of all cars quite wet, and made the cars smell some; this was also increased by the cars being kept closed on account of the storm, but none of them were dirty. This is also true of cars on the Saratoga–Warrensburg line, Nos. 39, 40 and 42, Troy–Glens Falls line, 28, 25, 31 and 41. These are all large double truck cars, upholstered with plush mostly, which is some worn, but I would not call it dirty or greasy and oily. Local cars, single truck, side seats, carpet and cane furnishing, some of which are quite well worn but not in a serious condition, were Nos. 12, 14, 15, 16, 19, 7 and 4.

Friday, December 21st

I was inside of and inspected the following cars at Glens Falls:

Saratoga–Warrensburg line, 38, 39, 40 and 42. (Car 44 is kept in the barn for an extra.)

Troy–Glens Falls line, 26, 29, 25, 21, 20 and 28. Some of these were ridden in between Glens Falls and Stillwater, and local cars on runs between Glens Falls and Ft. Edward and Glens Falls and South Glens Falls, 15, 13, 19, 31, 33, 35. I found all the local cars clean. The through cars were very clean, having been scrubbed, mopped and dusted. It all looked fresh and clean. The smoking room had two cuspidors, lately cleaned. Car 23, on the Greenwich branch, was in good condition, had been lately cleaned. Later in the day, in some of the cars there were pieces of paper under the car seats and steam pipes, and in one or two, in the smoking part, there was cigar ashes under the seat and steam pipes. There were all cleaned out at the end of the run.

Saturday, December 22d

I found the Mechanicville and Saratoga cars, Nos. 34 and 36, both clean and in good order, with signs up, "No Spitting on the Floor," etc., "By order of Board of Health." I was told that Saturday, December 22d, these signs were put up in all cars on this road. On this date I rode on all the cars operated between Mechanicville and Troy up to 2 p. m.

As to cleaning cars, I find that the Saratoga and Warrensburg line cars are swept out at Saratoga every trip, and every other night run in the barn at Glens Falls and thoroughly cleaned. The Glens Falls and Fort Edward local and the Glens Falls and South Glens Falls local cars are swept, mopped and dusted every night, and scrubbed every other night at the barns at Glens Falls.

Cars on the Troy and Glens Falls, Greenwich branch, Mechanicville and Saratoga lines are thoroughly scrubbed every other night or day at the barns at Stillwater. Cars are cut out through the day to clean.

Troy and Glens Falls cars are swept out on each run at Troy, where a porter is stationed for that purpose; but if the cars are on time they have only 5 minutes, so frequently they do not get much sweeping, if the car is late, but at all time some work is done. Each car that has a smoking room has two cuspidors; these are changed at Stillwater for two clean ones, going each way. From the looks of the steam pipes and floor of the cars I judge there has been much spitting on the floors; this I believe has been or will be stopped.

The upholstering of the large cars is mostly of plush, and in some of the cars it is quite well worn, but not to such an extent that it is objectionable. Some spots are worn smooth, but are not greasy as I can see. All but three or four of these through cars have been in service for some time and the paint and varnish have become scratched and marred. Some of the steam pipes, by the heat, have colored the paint. All of these conditions make a car look bad and dirty when it is not so.

I think the Hudson Valley Railway cars now compare favorably with any of the suburban long distance trolleys. The officers show a disposition to do all possible to keep their cars clean and in good order. Three new ones are expected January 1st; when they arrive there will be five cars for the extra list, and five surely will be thoroughly cleaned every night,— no doubt more: by this I mean scalding, scrubbing, washing paint, etc. I think this cause for complaint will be entirely removed and you will have no more trouble in this matter.

(Signed) JAMES E. BRAZEE,
Inspector

GLENS FALLS, *December* 22, 1906.

PHELPS

PHELPS, N. Y., *August* 24, 1906.

DR. EUGENE H. PORTER, *Commissioner of Health, Albany, N. Y.:*

MY DEAR DOCTOR:— Our High School, in the village of Phelps, must provide for its sewage. For the past two years we have used an old well on the premises. This was inadequate and we must either build a large cesspool or put in a sewer emptying into Flint creek.

In case we build a cesspool, must it be cemented, *i. e.*, water tight?

In case we want to empty into Flint creek, would your department give its consent?

Flint creek empties into Canandaigua outlet at the boundary limit of the village. It is a fair sized stream and would take care of such sewage.

Would it cost us anything to have you send us a member of the State board to confer with us in the matter? I am a member of

the Board of Education, also health officer, and as such want to do my full duty and do it right.

Telegraph us your advice on receipt of this letter and oblige,

Yours very truly,

DR. A. HOWE

In answer to above request the following telegram was sent to Sanitary Inspector Meehan:

ALBANY, N. Y., *August* 29, 1906.

Dr. JAMES H. MEEHAN, 432 *Third street, Niagara Falls, N. Y.*:

Go to Phelps, Ontario county and call on Dr. William A. Howe, on high school matter.

EUGENE H. PORTER,

State Commissioner of Health

ALBANY, N. Y., *September* 6, 1906.

WILLIAM A. HOWE, M. D., *Health Officer, Phelps, N. Y.*:

DEAR SIR:— Regarding the recent visit of one of our inspectors to Phelps, regarding the construction of a cesspool by your local board of health — as no ordinance or regulation covering the manner in which cesspools should be constructed is in force, the village board should adopt one. In all cases the regulation and method of construction of cesspools is looked after by the local board of health and regulations are in force in all the villages regarding them.

I am advised by our inspector that the question of a sewer system for the village is receiving some consideration. There is no doubt but that this is a very proper step for the village board to take, and I trust that the matter will continue to be agitated until this very important sanitary improvement can be installed. I will be very glad to furnish any information relative to the matter of the adoption of plans for a sewer system which you may desire, and will be glad to hear from you further on this subject.

As to the question of the nuisance created by the pickling factory, our inspector advises that a pile of decomposing matter has been allowed to accumulate in the rear of the factory. You

should order this removed at once and not allow such an accumulation to exist again.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

POPOLOPEN LAKE, ORANGE COUNTY

HIGHLAND FALLS, N. Y., *June* 30, 1906.

EUGENE H. PORTER, M. D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— At a meeting of the board of health, held at this office yesterday, a complaint was made to the board to the effect that there is on the premises known as Popolopen and Mine Lake in this town a stagnant condition of the waters of the lakes, due to draining the lakes in summer, which greatly endangers public health, and the board request your advice and assistance in the matter and ask that an inspector be sent here from your department to investigate the conditions and assist the board in the matter, as they are not sure how to proceed to prevent the draining of the lakes.

Very respectfully,

MOSES F. NELSON,

Town Clerk

AMSTERDAM, N. Y., *September* 17, 1906.

EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In the matter of the complaint received by the department from the board of health of the town of Highlands, Orange county, regarding the drainage of Popolopen lake, I would report that I visited the lake in company with Mr. Moses F. Nelson, town clerk, and found that the level had been drawn down about ten feet below the crest of the dam, laying bare, approximately, 100 acres of mud flats.

It was stated by Mr. Nelson and Mr. Wm. Redner, who resides near the lake and whose father owns the greater part of the

property fronting on the lake, that in 1717 the water rights of the lake, which was then at a lower level, were released to a mill property on the Hudson river. In 1880 the Forest of Dean Mining Co. erected a dam at the outlet of the lake, raising the water level to the present dam crest. It was not known by these gentlemen whether this company had succeeded to the water rights held by the mill on the Hudson. Later the Hudson Iron Co. leased the iron mine near the lake from the Forest of Dean Mining Co. and this company has since June been drawing down the water in the lake to supply water power with which to pump out the unworked mine.

Only one dwelling is situated directly on the lake, that of Mrs. Lewis Potter. Mrs. Susan Clark also owns property fronting on the lake.

In the summer season successive camps of from forty to fifty "fresh air" children are maintained on the lake, as well as numerous private camps, the camping population numbering sometimes as high as 1,000 persons. As a camping and recreation resort the lake is worthless this year on account of the draining by the Hudson Iron Co. No odor was noticeable at the time of the inspection.

The town board of health had previously applied to the Forest, Fish and Game Commission for relief in the matter, and since I could discover no pronounced unsanitary condition, it was arranged that Mr. Nelson would refer the Forest, Fish and Game Commission to the department of health for corroboration of the partial destruction of the lake, since, as the lake has been stocked with fish by the commission, the case was more clearly within their jurisdiction.

But since the department has not been communicated with by the Forest, Fish and Game Commission I have made the above report.

Respectfully submitted,

H. B. CLEVELAND,
Assistant Sanitary Engineer

FINDLEY LAKE, CHAUTAUQUA COUNTY.

FINDLEY LAKE, N. Y., *May* 18, 1906.

Department of Health, Albany, N. Y.:

SIRS:— The village of Findley Lake is situated upon the banks of Findley lake, around the outlet. The lake is partially artificial. Think the waterfall is nine or eleven feet. Owing to dry weather and the drawing of water for mill purposes the lake is getting rather low and the people are getting somewhat alarmed about the consequences to health. The lower the lake gets the more water has to be drawn daily to do the mill work. The lake is now about four or five feet below normal level for this time of year. There have in times past been epidemics of fever here due, it was locally supposed, to low water or to high water after a long period of low water. We would like very much to have your advice in this matter before the local board takes any aggressive steps in the matter. I recently called the mill owner's attention to the situation but he seemed very slightly concerned and said he had to have the water. Any action we might take here would have to be strongly backed to be effective with the owner of water rights. I would like advice as soon as you can furnish it.

Respectfully yours,

J. J. FINN

AMSTERDAM, N. Y., *August* 21, 1906.

EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— Following your instructions, I visited Findley Lake, Chautauqua county, to examine into an alleged nuisance created by the lowering of the lake caused by the operation of a saw and grist mill owned by Mr. Louis Schwartz.

Health Officer J. J. Finn informs me that Mr. Schwartz has succeeded to flowage rights which enabled former owners of his property to raise the natural lake level 10½ feet, and during the past summer, until about four weeks ago, has taken advantage of his water rights to the end that the lake level was lowered about five feet. Since the drawing of the water was stopped the lake

level has risen one foot. In this, as in other cases, the lowering of the lake, which is about three miles long, has not resulted in a definite nuisance or a positive menace to the public health.

But, as in many similar cases, cottagers have built along the shores of the lake and the lake level has not been disturbed until during a period of many years several hundred people have come to occupy improved property on the lake during the summer months. Then, when the lake is lowered, the value of the summer resort is greatly impaired.

Would it not be well to call for an opinion from the Attorney-General's office as to the rights of riparian owners to disturb summer resorts in this manner?

Practically the same question is before the department in the case of Popolopen lake in Orange county.

It would appear to be questionable whether the department could take up these matters on sanitary grounds and relieve the situation resulting from this private use of rights to the public's loss of privileges.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

ROCHESTER TALLOW COMPANY

STATE OF NEW YORK — EXECUTIVE CHAMBER,

ALBANY, *December* 1, 1905.

Dr. EUGENE H. PORTER, *Commissioner of Health, Albany, N. Y.*:

DEAR SIR:— By direction of the Governor I herewith transmit orders signed by the Governor under section 6 of the Public Health Law, directing you to investigate certain nuisances therein referred to, together with the petitions upon which such orders were issued.

Yours truly,

CUTHBERT W. POUND,
Counsel to the Governor

STATE OF NEW YORK — EXECUTIVE CHAMBER

To the Commissioner of Health:

I have been presented with a petition signed by various residents of the city of Rochester, alleging that on the south side of Campbell street in the said city of Rochester, the Rochester Hide and Tallow Company is engaged in operating its plant so as to create a public nuisance and menace to the health and comfort of the people residing in that vicinity.

I, therefore, require you, in accordance with the provisions of section 6 of article 1 of the Public Health Law, to make an examination into the alleged nuisances and questions affecting the security of life and health in the locality aforesaid, and report the result thereof to me, on or before the first day of January, 1906.

Dated at the Capitol in the city of Albany this first day of December in the year of our Lord one thousand nine hundred and five.

FRANK W. HIGGINS

By the Governor:

FRANK E. PERLEY, *Secretary to the Governor*

In the Matter of the Investigation into the Alleged Nuisance of Carrying on the Business of Rendering Slaughter-house and Meat-market Offal in the town of Gates, Monroe County, New York.

To the Honorable FRANK W. HIGGINS, *Governor of the State of New York, Albany, N. Y.:*

SIR.— Pursuant to your instructions under date of December 1, 1905, requiring me, in accordance with the provisions of section 6 of article 1 of the Public Health Law, to make an examination into the alleged nuisances and questions affecting the security of life and health in the city of Rochester, caused by the operation of the plant of the Rochester Tallow Company; I have the honor to report as follows:

On the 2d day of December, 1905, I received from you the following petition and order:

Petition.

To his Excellency the Governor of the State of New York:

The petition of the undersigned respectfully shows that the Rochester Hide and Tallow Company are maintaining a nuisance and menace to the public health at their plant situate on the south side of Campbell street, as extended from the city of Rochester into the town of Gates and just west of the city line of said city; that the following are the facts upon which the foregoing statement is predicated and upon which this petition is based:

The plant of the said Rochester Hide and Tallow Company is maintained in an unsanitary condition, from which emanates an unbearable stench. Campbell street, upon which said plant is located runs in a westerly direction; that within 600 feet upon the north side thereof is Jay street and upon the south side of Campbell street about the same distance is Maple street; that within 1,200 feet immediately east of said plant are the following streets as you pass toward the east: Dallas, Reichenboer, Hague and Ames streets; that within a radius bounded on the east by Ames street, on the north by Jay street, on the west by town of Gates, upon the south Maple street, there is a population of about 4,000 people. In addition to this within this same territory is located the Holy Family Church, Holy Family School, parsonage and convent. The Holy Family Church has a congregation of upwards of 5,000, the parish school has an average attendance of upwards of 1,100 pupils, and in the convent there are 22 sisters. This tract of land substantially 1,200 feet square and populated and used as hereinbefore stated is subject to this unbearable stench and unsanitary condition for the reason that the prevailing winds in this locality are from the west, southwest and northwest.

For these reasons we most respectfully petition that the said Commissioner of Health be instructed to investigate this charge and that he make his report thereon to the Governor with all convenient speed in accordance with section 6 of the Public Health Law.

D. LAURENZIS
Rector Holy Family Church
CHAS. HETZLER
JOS. BINGHOLZ
ANTON KLEEHK

Dated, November 21, 1905.

To the Commissioner of Health:

I have been presented with a petition signed by various residents of the city of Rochester, alleging that on the south side of Campbell street in the said city of Rochester, the Rochester Hide and Tallow Company is engaged in operating its plant so as to create a public nuisance and menace to the health and comfort of the people residing in that vicinity.

I, therefore, require you, in accordance with the provisions of section 6 of article 1 of the Public Health Law, to make an examination into the alleged nuisances and questions affecting the security of life and health in the locality aforesaid, and report the result thereof to me, on or before the first day of January 1906.

Dated at the Capitol in the city of Albany this first day of December in the year of our Lord one thousand nine hundred and five.

(Signed) FRANK W. HIGGINS

By the Governor:

(Signed) FRANK E. PERLEY, *Secretary to the Governor.*

In pursuance of said order, I made an examination into the alleged nuisances and questions affecting the security of life and health required by said order, through A. H. Seymour, an inspector appointed for that purpose, who attended at the said city of Rochester, on December 9, 1905, and after hearing Messrs. Werner & Harris of said city, the attorneys for the petitioner, and D. Laurenzis, one of the petitioners in person, as to the said complaint, visited the locality where said nuisances were alleged to exist and made a personal inspection of the plant of the Rochester Tallow Company, which is referred to in the foregoing petition as the Rochester Hide and Tallow Company, a misnomer, as the corporate name of said company is the Rochester Tallow Company.

The plant of the said company is situated on the south side of Campbell street in the town of Gates, immediately adjoining the western boundary of the corporate limits of the city of Rochester.

The officers of this company are as follows: President, Benjamin Haag; vice-president, H. W. Hewer; secretary, Joseph Vocht; treasurer, Frederick Blaese; general manager, Charles Erdle; offices 78-80 Front street, Rochester. Factory in the town of Gates.

It is a domestic corporation and began business in August, 1904; it succeeded the Rochester Hide, Skin and Fat Melting Association, which had as its president, secretary and treasurer the same persons as the present company. The Rochester Tallow Company took over the business of rendering slaughter-house and meat-market offal, which formerly was conducted at an adjoining plant owned by the Rochester Packing and Cold Storage Company, against which complaints were made in the summer of 1902, and investigated by this Department.

It was found at that time that a nuisance existed, and the company agreed to discontinue the rendering business. It did discontinue the business of rendering and make it over to the Rochester Hide, Skin and Fat Melting Association. The plant of the Rochester Tallow Company, which succeeded the last named corporation, adjoins the plant of the Rochester Packing and Cold Storage Company on the north and they are but a short distance apart. The business of rendering, even if conducted with the greatest care, is, in my judgment, not a proper one to be permitted in a residential district. The transfer of the business of rendering from one plant to another, a few feet further north, and the same distance from the Rochester city line, afforded but little relief to the inhabitants of the district, although some improvements were no doubt made in the character of the apparatus employed. The business as at present conducted is that of rendering offal from slaughter-houses and meat markets of the city of Rochester. The amount of material handled in November, 1905, was 330,567 pounds, as it appears from an examination of the books of the company, and I am informed by the manager is a fair average month's rendering. Of the above amount, 140,000 pounds consisted of bone; the rest was fat, tallow, scrap meat and carcasses of animals. This material is rendered into grease, tallow and fertilizer; it is cooked or digested in four steam digestors, in two of which is a combined digesting and drying apparatus in which the drying is done in the same receptacle as the cooking and under a partial vacuum maintained by a suction pump. The regular operation of these cookers or digestors is no doubt unobjectionable and would probably continue to be so if care was exercised to prevent foul and obnoxious odors from escaping. The fact remains, however,

that exceedingly foul odors occasionally escape from the plant. It is claimed by the manager that this has occurred but upon one or two occasions when accidents occurred. The repeated and continued complaints which have been received would indicate that that is not the case. The offal and scrap from meat markets and slaughter-houses, together with some carcasses of animals and fowls, is brought to the factory in open wagons, in boxes and barrels, and is transferred from the wagons to the first floor of the building. It is then chopped up and shoveled or dumped into the digestors or cookers on the second floor of the building. There are four of these digestors, constructed of iron, and each having a capacity of several tons. The offal, meat and bones are cooked in these digestors, the grease drawn off into a tank, and the solid matter dumped out into cans, taken to the basement, and while hot is put in bags or cloths and placed in a press where the liquid matter left is forced out.

Stored in the basement of the building are barrels of grease and there is also a press — the above referred to for drying the refuse taken from the cookers — and the material used in this press gives off a very foul odor. On the first and second floors are stored numbers of boxes and barrels containing bones, scrap meat and offal and the floors of the building are very filthy. On the top floor is stored the fertilizer product made from the refuse. The character of the business, together with the product and material handled, unite in making it the source of obnoxious odors, especially in the warm weather.

Only by very careful attention could the plant be operated without making it a nuisance, and in my opinion the business is one which should never have been established in a thickly settled neighborhood such as adjoins this plant on the east. I did not attempt to verify the figures given in the complaint as to the population within the distance mentioned, but it would appear that the population is very large, although probably somewhat over estimated. It is a fact that within the district bounded by the city line upon the west, Jay street upon the north, James street upon the east and Maple street upon the south, which district is about 1,200 feet in extent each way and immediately contiguous to the plant in question, there is a population of upwards of 2,000 people,

and that within this territory are situated also the parsonage, convent and church of the Holy Family and the Holy Family School. It is stated by D. Laurenzis, Rector of the church, that it has a congregation of 5,000 people, the parish school an attendance of over 1,000 pupils and that there are about twenty sisters in the convent.

From my investigation of this factory and the examination made I make the following findings of fact:

I.

That the business of rendering is not a proper one to be conducted in a residential district, and should be allowed to be conducted only where the greatest care and caution are exercised in its management.

II.

That foul and obnoxious odors are given off from the said Rochester Tallow Company, which constitute a nuisance more or less injurious to the enjoyment of property rights.

III.

That the said factory is engaged in rendering large quantities of offal and meat, and that the business is conducted in a thickly settled neighborhood, and that the works are in a filthy and unsanitary condition.

IV.

That said works as at present operated constitute a nuisance injurious not only to the enjoyment of property rights, but to the public health, as foul and noxious odors are given off in large quantities, which permeate the neighborhood and are almost unbearable in warm weather.

I would, therefore, recommend that the Governor make an order declaring the business as at present conducted to be a public nuisance, and order the abatement thereof, or direct that the operation of the plant be discontinued in case it shall be ascertained that the company is unable or unwilling to maintain and operate the plant in a manner unobjectionable to the residents of that vicinity.

In order to ascertain the conditions I would recommend that the order provide that an inspector be appointed by the Commis-

sioner of Health, whose duty it shall be to enforce such sanitary rules and regulations as may be prescribed by the Department of Health for the conduct of the business carried on by said Rochester Tallow Company, said inspector to hold office during the pleasure of the Commissioner of Health, and to be paid a salary of $300 per year, monthly, in advance, by the corporation carrying on the business above referred to. That said inspector shall be required to visit and make a careful inspection of the plant of said Rochester Tallow Company at least once in each week, and as often in addition thereto as required by the Commissioner of Health. That it shall be his duty to report to the Commissioner of Health weekly from June 1st to November 1st in each year, and monthly at other times, upon the general sanitary conditions of said factory, and also report to the Commissioner of Health all violations of sanitary rules and regulations prescribed by him within twenty-four hours after such violation; and in default of compliance with the rules and regulations of said Commissioner of Health by said corporation, the Governor make such further orders on the application of the Commissioner of Health as may be necessary to abate the nuisance complained of.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

Dated, December 30, 1905.

ALBANY, N. Y., *February* 1, 1906.

DR. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

SIR:— I herewith enclose a copy of an order in the matter of the Rochester Tallow Company, made by the Governor under date of January 31, 1906.

Yours respectfully,

CUTHBERT W. POUND,
Counsel to the Governor

STATE OF NEW YORK — EXECUTIVE CHAMBER

Order directing the abatement of certain public nuisances in the town of Gates, Monroe county, New York.

Whereas, On the 22d day of November, 1905, D. Laurenzis, Rector Holy Family Church, and others, presented their petition to the Governor of the State of New York complaining of a certain nuisance alleged to exist in the town of Gates in the county of Monroe, and State of New York, which nuisance it was charged in said petition annoys, injures and endangers the comfort of many persons in the neighborhood of the plant of the Rochester Tallow Company in said town, and praying that the matter be referred to the State Commissioner of Health for examination and report, to the end that on the coming in of such report an order might be made in accordance with section 6 of the Public Health Law; and,

Whereas, On the 1st day of December, 1905, the Governor transmitted the said petition to the State Commissioner of Health, with his order requiring the said Commissioner to investigate the charges therein contained and to examine into the nuisance therein complained of, and to report the result of such investigation and examination to the Governor; and,

Whereas, The State Commissioner of Health did thereafter examine into said nuisance and did, on the 30th day of December, 1905, make his report to the Governor, by which report said Commissioner finds and certifies that the business of the Rochester Tallow Company, as carried on in said town of Gates, is a public nuisance, as by said report, reference being had thereto, will more fully appear; and,

Whereas, The Governor ordered the said Rochester Tallow Company to show cause before him on the 12th day of January, 1906, at 3 o'clock in the afternoon, at the Executive Chamber, why the order recommended by the State Commissioner of Health should not be made by the Governor in accordance with the recommendations made in said report; and,

Whereas, Said hearing was postponed to the 26th day of January, 1906, at 3 o'clock in the afternoon, at which time the parties duly appeared; and,

Whereas, It appears that the business of said Rochester Tallow Company, as at present conducted, is that of rendering offal

from slaughter-houses and meat markets of the city of Rochester, which is rendered into grease, tallow and fertilizer by being cooked or digested in four steam digestors, from which foul and obnoxious odors at times escape, and that the offal, meat and bones and the product of said plant give off foul odors, especially in warm weather, and that said plant is established in a thickly settled neighborhood, and that said business is not a proper one to be so conducted in a residential district, and that, as conducted, it annoys, injures and endangers the comfort of many persons in said locality.

Now, therefore, I, Frank W. Higgins, Governor of the State of New York, in pursuance of section 6 of the Public Health Law, do hereby declare the business plant of the Rochester Tallow Company, as operated in the town of Gates, in the county of Monroe and State of New York, a public nuisance, annoying, injuring and endangering the comfort of many persons in said locality, and I do hereby approve the report of the State Commissioner of Health of his examination thereof, and order that the same be filed in the office of the Secretary of State; and I do hereby further order that said nuisance be changed, abated or removed as herein directed, and I do further order that the Commissioner of Health appoint an inspector for said business plant of said Rochester Tallow Company, whose compensation shall be fixed by said commissioner, not to exceed $300 per annum, to be paid monthly in equal parts by said corporation, who shall hold office during the pleasure of said Commissioner of Health, and shall visit the plant of said Rochester Tallow Company and make a careful examination thereof at least twice in each week, and as often in addition thereto as the State Commissioner of Health may prescribe and shall report to said commissioner all violations of this order and all violations of sanitary rules and regulations within twenty-four hours after such violation, and it shall be his duty to report to the said State Commissioner of Health weekly upon the general sanitary condition of said plant of said Rochester Tallow Company.

And I do further order that in default of compliance with this order by said Rochester Tallow Company, such further order or precept may issue, upon application of the State Commis-

sioner of Health, as may be necessary to secure the abatement or removal of the nuisance complained of.

Given under my hand and the privy seal of the State, at the Capitol, in the city of Albany, this thirty-first day [L. S.] of January, in the year of our Lord one thousand nine hundred and six.

FRANK W. HIGGINS

By the Governor:

FRANK E. PERLEY, *Secretary to the Governor*

ALBANY, N. Y., *February* 24, 1906.

ROCHESTER TALLOW CO., 78–80 *Front Street, Rochester, N. Y.*:

GENTLEMEN:— You are hereby notified that pursuant to the provisions of the order, signed by Hon. Frank W. Higgins, Governor of the State of New York, dated the 31st January, 1906, I have appointed Montgomery E. Leary, M.D., of Rochester, inspector of your plant, who is required to visit and inspect the said plant as provided by the terms of the order above referred to.

I have fixed his compensation at $300 per annum, pursuant to the provisions of the said order, which is to be paid monthly in equal parts by you.

I enclose you herewith bill for $25 for the salary of inspector for the month of February, 1906, which you are requested to remit to me at once, and you will be expected to remit the same amount promptly on the 15th of each succeeding month.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

SCHENECTADY, MOHAWK GAS COMPANY

AMSTERDAM, N. Y., *June* 29, 1906.

DR. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR:— I made an inspection of the Mohawk Gas Company's plant at Schenectady, on June 28, as you suggested, in order to take up the matter of the pollution of Cow Horn creek.

For several years a partial clarification of the mixture of oily

tar and water, resulting from the washing of gas, has been accomplished at the plant by means of settling tanks, and since June 20 this method has been supplemented by a coke filter. The filter clogs after some use, but may be brought into effectiveness again by raking, and still better by replacing the coke filtering material. This last remedy is made possible only by the installation of two filters, and it is the Gas Company's intention to construct an additional filter. The work of clarifying the effluent from the gas tanks and eliminating the odor complained of is necessarily an experiment. The refuse from the plant is discharged into a city sewer and flows several hundred feet before reaching Cow Horn creek, and unless such discharge relieves them from the provisions of paragraph 77 of the Public Health Law I would suggest that the Mohawk Gas Co. (Mr. Howard White Starr, manager) be required to make application, accompanied by a plan of the clarification plant proposed, for a permit to discharge refuse from the gas plant into Cow Horn creek.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

SCHENECTADY, N. Y., *July* 6, 1906.

State Board of Health, Albany, N. Y.:

GENTLEMEN:— We have been requested by the local authorities to send you a plan for your approval of the alterations we propose to make at our works in order to eliminate the tarry oils from our sewage which have been the cause of some complaint from persons residing directly over Cow Horn creek. We accordingly send you under separate cover a plan showing the apparatus which we have installed at present and the additions which we are making. The plan shows that the water containing tarry matter coming from the gas-making apparatus enters a box 14 feet long by 7 feet 4 inches wide and 3 feet 6 inches deep. This box has seven partitions in it, the partitions extending alternately to the surface of the water, the direction of the flow of the water is shown by the arrows. These partitions act as skimmers and hold back the tar and give it a chance to settle at the bottom, from where it is drawn off and burned in our boilers.

This small tank was installed by one of the leading gas engineers of New England, but when we first received complaints of the odor of the tarry oils contained in our sewage we investigated this box and found that it was not built according to proper principles, as considerable tar was discharged with the water from this tank. There was not sufficient space under the alternate divisions and we made the necessary alterations in this tank and received no further complaints for some time. We were, however, notified this winter by the local board of health that we must arrange to discontinue emptying any sewage containing tarry matter into Cow Horn creek. We accordingly installed the coke filter shown. This filter is 12 feet wide by 24 feet long and contains a bed of powdered coke or coke breeze 4 feet 4 inches deep. The bottom of this filter bed is covered with wooden grids to permit the water to escape to the partition shown in the end of the box after it has passed through the bed of coke breeze. The water coming from the small separator tank flows into the filter bed of coke breeze, which eliminates all traces of tar and discharges perfectly clear water into the sewer. We have found by experience, however, that this bed of coke breeze requires frequent raking over in order to prevent the tar which is held back on the surface from clogging up the filter and thus causing the water which should be filtered to flow over the partition into the outlet without being filtered. In order, therefore, to obviate the necessity of constantly watching this coke filter we are installing a large separator box which is 14 feet wide by 24 feet long. The water level in this box is 5 feet 6 inches from the bottom. The plan shows by the arrows the direction of the flow of the water. We expect that this separator will discharge perfectly clear water, in which event it will not be any longer necessary to make use of the filter. If it should not, however, we have shown on the plan that the water from this new separator may be sent through the coke filter before discharging into the sewer. We propose, however, to try to operate our plant in such a way that the water coming from the gas-making apparatus will go first through the small separator box then through the large separator box and then to the sewer, and if necessary, as stated, to the coke filter before going finally to the sewer.

We further propose to pump back into our apparatus a very considerable proportion of the water coming from it, in order to use it over and over again and thus to diminish the outflow to the sewer. This will help the separator boxes materially, as it is important, in order to separate oily tar from water, that the oily tar and water should have as long a period as possible to separate, the specific gravity of oily tar being 1.09, which is so near the specific gravity of water that it takes some time for it to separate from the water.

We expect to have the second separator box in operation within a few days and do not anticipate that we shall have any further complaints after it is put in operation. We would refer you, in connection with the separation of oily tar from water, to the Proceedings of the American Gas Light Association, Vol. 15, page 69. We have made a thorough study of this question and have looked up all of the authorities on the subject and find that they all agree that a tank constructed similar to the large tank which we are installing will do the work effectively.

We should like to have it understood that we are most anxious to eliminate any cause of complaint. We have never received any complaints during the summer time and the only complaints we have ever received have been from but two persons. One of these persons owned a house which had an old culvert laid up with flat stones and with no joints between the stones, running directly under the house, and which connected with Cow Horn creek, and through this culvert they occasionally got odors of the oily tar. This cause of complaint, however, was eliminated when these parties blocked up this old culvert outside of their building wall. The other party who has made complaint lives on Barrett street in a house which is immediately over the culvert of Cow Horn creek. The culvert is evidently not tight at this point and we intend to offer to plaster the culvert in this party's cellar with Portland cement in order to eliminate any further complaints. This will obviously be most desirable for this party, as Cow Horn creek is used as a sanitary sewer, and if they can smell the tar discharged from our sewage they must also get sewer gas in the house, which has no odor but which is, of course, most injurious.

From neither have we received any complaints since we have been discharging clear water into the sewer.

We desire to say that the oil which Mr. Cleveland found in a manhole near the railroad track when visiting our works with Mr. Harbison, the local plumbing inspector, was gas oil which had evidently leaked into the manhole either from the pipe line through which we pump oil from our railroad siding to our works or it may have gotten into the manhole at the time we disconnect the oil tank cars from our pipe line, when there is always a little oil to escape. We have taken steps, however, to remedy this and have also repaired a leak in our pipe line which we found. Mr. Harbison will corroborate our statement that it was gas oil which Mr. Cleveland found and we wish to have it understood that we showed Mr. Cleveland the only outlet which we have and we are discharging clear water into the sewer, as Mr. Cleveland saw, at the manhole on South Center street. We understand that Mr. Cleveland told Mr. Harbison that there was a considerably larger volume of sewage discharged into the manhole mentioned than could be accounted for by the filter. This is due to the fact that we use water in cooling the gas, but this water does not in any way come in contact with the gas and consequently is discharged into the sewer as perfectly clear water, the filter discharging into the same trunk sewer, which we think will explain to your satisfaction the larger volume of water found by Mr. Cleveland when examining the manhole on South Center street than he found was flowing through the filter.

Very truly yours,

MOHAWK GAS COMPANY,

H. W. STARR,

Manager

THOMPSON RIDGE, ORANGE COUNTY

June 20, 1906.

We, the undersigned property owners adjoining the stream which is the one polluted in the town of Crawford, respectfully ask your attention to the pollution of this stream by the Reid

Ice Cream Co., for the reason that it is a nuisance and damage, and the local authorities as yet have failed to act.

J. W. KERR
JOHN McCARROLL
G. F. ARMSTRONG
E. B. SAMMONS
A. S. DICKERSON

ALBANY, N. Y. *September* 27, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:—In regard to the pollution of the meadows below the hamlet of Thompson Ridge in the town of Crawford, Orange county, by the Reid Ice Cream Company, a complaint in regard to which was filed in this office by J. H. Kerr, owner of the property upon which the creamery wastes are discharged, and others, I beg to report as follows:

The locality was visited by one of the engineers of this Department, July 21st who, in company with the Health Officer, Dr. F. H. Dreyer, made a careful inspection of the character and extent of the pollution and the nuisance caused thereby. It was found that the meadow land upon which the creamery wastes are discharged was grossly polluted and that owing to the small quantity of water flowing in the stream which traverses the meadow, a serious nuisance is created and a menace to health of the cattle owned by Mr. Kerr, which graze at times in this meadow.

It appears that about 40,000 gallons of water are used in washing cans of the Reid Ice Cream Company, with which is used from ten to twelve pounds of sal soda, a chemical which it is claimed poisons the cattle. These wastes after traversing the meadow for a distance of about one-half mile enter a feeder of the west branch of Pakanasink creek which flows into Shawangunk Kill and thence into Wallkill river. The drainage area of the stream at the lower end of the meadow is about three and one-half square miles, the summer flow of which might average one-half million gallons for twenty-four hours.

If the wastes from the creamery should be passed through a

septic tank and the effluent discharged through a sewer laid for a distance of about one mile through the meadow to the branch of Pakanasink creek southeast of the Erie railroad, it is probable that no nuisance would result and that the dilution of the chemicals used would be so great as not to effect the health of cattle.

In case it was found that this did not sufficiently purify these waters, contact or sand filters could be used in conjunction with the septic tank and further purification secured.

It might be stated in this connection that the purification of creamery wastes is a matter which has not been sufficiently studied to know what is the best method to employ in practice. The State of Massachusetts has certain investigations under way on this class of manufacturing wastes and the present instance points to the desirability of taking up similar studies by this Department in this new field of sewage purification experiments.

In view of the foregoing, I should recommend that the Reid Ice Cream Company be required to purify the waste from the creamery which now flows onto the meadow below and causes a nuisance and menace to health on the property of J. H. Kerr. In order to accomplish this I would suggest that the Reid Company proceed to install:

1. Some complete process of purification, such as septic tanks and contact filters, that will produce effluent of sufficient purity so that it may be discharged into the small stream passing through the meadow, the flow of which is now principally maintained by an artesian well upon the premises, or —

2. Some less complete method of treatment, such as septic tanks, which will produce an effluent of less, though sufficient purity, so that it might be discharged through a sewer constructed through the meadow into the west branch of Pakanasink creek about 5,000 feet north of the creamery where the small stream from the meadow joins it.

I consider that if either of these means of disposal are carried out and properly maintained the trouble now existing and complained of will under present conditions be remedied.

Respectfully submitted,

THEODORE HORTON,
Consulting Engineer

ALBANY, N. Y., *October* 15, 1906.

MR. J. E. WARD, *President Board of Health, Town of Crawford, Pine Bush, N. Y.:*

DEAR SIR:— Complaint having been filed with this Department that the stream passing through the meadows owned by J. H. Kerr, in the town of Crawford, was being polluted by creamery wastes and wash water from the cans used by the Reid Ice Cream Company being discharged therein, an investigation was made by this Department and it was found that the character and extent of the pollution of this stream was such as to create a nuisance, and such discharge of waste matter into the stream being in violation of the provisions of section 75 of the Public Health Law, you are directed to convene the town board of health for the purpose of taking such action as is required by the provisions of section 79c of the Public Health Law.

The Reid Ice Cream Company must dispose of its waste matter in a sanitary manner, and in order to accomplish this I would recommend that your board of health notify the company at once that it will be necessary for them to proceed to install some complete process of purification, such as septic tanks and contact filters, that will produce effluent of sufficient purity so that it may be discharged into the stream passing through the meadow; or some less complete method of treatment, such as septic tanks, which will produce an effiuent of less, though sufficient purity, so that it might be discharged through the meadow into the west branch of Pakanasink creek about 5,000 feet north of the creamery where the small stream from the meadow joins it.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

SEARSVILLE, *October* 30, 1906.

DR. E. H. PORTER:

DEAR SIR:—A meeting of the board of health of the town of Crawford, Orange county, was held to-day and the following is a copy from the clerk's book:

At a meeting of the board of health of the town of Crawford held at the store of Clark Brothers, at Thompson Ridge, a letter from the State Board of Health in regard to the pollution of a

stream of water running through the lands of J. W. Kerr was read, and turned over to the health officer, Dr. F. H. Dreyer to obtain plans and specifications from the engineering section of the health department to stop said pollution. If you will kindly approve the action as above set forth and have these plans and specifications prepared by Mr. H. B. Cleveland or under his direction as he is thoroughly familiar with this matter, and sent to me at above address, as soon as possible, I will forward them to the Reid Ice Cream Company.

Very fraternally,

F. H. DREYER

ALBANY, N. Y., *November* 12, 1906.

F. H. DREYER, M.D., *Health Officer, Searsville, N. Y.:*

DEAR SIR:— I am in receipt of yours of recent date, together with copy of resolution of the board of health of the town of Crawford regarding the Reid Ice Cream Company.

It is the duty of your board to serve further notice upon these parties, as required by law, ordering them to stop the pollution of this stream. It is not the duty of this Department, nor can it undertake to prepare plans and specifications for the necessary sewer system or septic tanks needed in order to check the pollution.

The proper legal notice must be served by your board at once and it is then up to the Reid Ice Cream Company to procure an engineer, if necessary, to make such changes as are required. The small appropriation allowed this Department for the employment of engineers does not warrant our undertaking to do the work of individuals throughout the State.

Notice was served upon the president of the board on October 15th, to convene the board and take the action required under section 79c of the Public Health Law. It is evident from the resolution passed by your board that no attempt was made to serve the proper notice upon these parties; and I wish you would advise me at once if your board proposes to do so. If not, it will be necessary for me to make a further order in this matter, requiring your board to again convene and take the proper legal action.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

WATERVLIET

ALBANY, N. Y., *October* 3, 1906.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— At your request I have had our Assistant Engineer, Mr. Cleveland, investigate the complaint made to Dr. L. B. Rulison, health officer of Watervliet, relating to the escaping gas from the Covert Manufacturing Company, located in that city.

This manufacturing company uses some ten small forges in carrying on its business and it is alleged that the gas escaping from these forges creates a nuisance and is a menace to the health of residents nearby, especially to the family of Mr. A. Ketterson, who resides at No. 1530 Sixth avenue. On the day of Mr. Cleveland's visit there were no odors of gas escaping from the factory that could in any way be considered a nuisance — much less a menace to health. The ten small forges in use consume only about 300 pounds of coke per day and it is evident that the burning of this small amount of coke could not, under the conditions existing on the day the factory was visited, be classed as a nuisance or a menace to health.

In view of the foregoing, I do not consider the complaint justified and should recommend that Dr. L. B. Rulison be so notified.

Respectfully submitted,

THEODORE HORTON,
Consulting Engineer

ALBANY, N. Y., *October* 4, 1906.

Dr. L. B. RULISON, *Health Officer, Watervliet, N. Y.:*

DEAR SIR:— I enclose you herewith copy of the report of Mr. Theodore Horton, the consulting engineer of this Department, on the investigation made at Watervliet.

Very respectfully,

EUGENE H. PORTER,
Commissioner of Health

WHEATFIELD

Hon. EUGENE H. PORTER, M. D., *Commissioner of Health:*

GENTLEMEN:— The town board of health of the town of Wheatfield within said district in regular session, January 27, 1906, do hereby represent and state to you:

That heretofore and within said town and since the erection of the State dam across the Tonawanda creek near its mouth at the city of Tonawanda, there has been each and every year an overflow in the creek or channel known as Sawyers creek in the low lands in said town adjacent to said Sawyers creek, of back water in the spring, summer and fall, caused by the erection of said State dam, and the water has been forced back into the low places of the channel of said Sawyers creek and there permitted to stand for months and become stagnant, the fishes therein dying and impregnating the air with disease-bearing microbes, and as a consequence, sickness has prevailed in that locality of the nature of malaria and typhoid fever, caused to some extent by the presence of said stagnant or dead water so in the channel of Sawyers creek, produced and caused by said overflow and such overflow produced by the erection of said dam across said Tonawanda creek. We therefore, apply to your honorable body, the State Board of Health, to investigate into this matter and grant us relief as this trouble is caused directly by State water from the Erie canal. We think that the aid of $3,000 would be sufficient to give us relief and we beg the honorable State Board of Health to assist us by getting the appropriation.

(Signed) WM. H. SCHMIDT,
Presiding Officer
EDWARD E. GOERSS,
Secretary
CHRISTIAN WOLF,
WILLIS M. MILLER,
WM. C. MUELLER,
GEORGE C. TOELLNER,
Justices
J. E. HELWIG,
Health Officer
AUGUST WERTH,
Citizen Member

SCHENECTADY, N. Y., *March 5*, 1906.

DR. E. H. PORTER, *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR:— On February 21st, you directed that an investigation should be made into the alleged defective conditions of the stream flow in Sawyers creek in the town of Wheatfield, Niagara county, in accordance with a petition from the town board of Wheatfield, dated January 27, 1906.

I accordingly directed Mr. Eric T. King on February 22d, to make an investigation of the stream and to report on the same.

Mr. King states that he found, on reaching the town of Wheatfield, that another communication, written by the supervisor at the direction of the town board, describing the situation and essentially modifying the terms of the petition, had been sent to the State Department of Health. This communication, however, was not sent me with the petition.

I enclose herewith a copy of Mr. King's report, accompanied by a sketch-map of the local situation. From this report and from other sources of information, it is quite evident that the stream is in a defective condition, and that this condition is due, in part at least, to the backing up of water into the creek from the canalized portion of Tonawanda creek, which, as you know, is used in this portion as the line of the Erie canal.

The importance of improving the stream conditions along this creek, as a sanitary measure, is apparent, and, as the conditions are produced, or at least have been greatly aggravated by the fact that the water is backed up into Sawyers creek by the Erie canal, would seem to warrant an application for an appropriation from the State to cover a portion at least of the cost of putting the stream in proper condition. As the subsequent communication above referred to from the supervisor is said to represent the later wishes of the town board, and, is said to modify very considerably the terms of the request, I am unable to make more definite recommendation than that indicated above.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer

SCHENECTADY, N. Y., *February* 28, 1906.

OLIN H. LANDRETH, *Consulting Engineer:*

DEAR SIR:— In accordance with instructions received from you by letter on February 22d, I proceeded that night to Tonawanda, and there made such inspections and collected such information as pertained to the petition from the town of Wheatfield, which petition is enclosed.

Following is a descriptive report on the matter classified under the leading features presented. Dr. J. E. Helwig, health officer, and William H. Schmidt, supervisor of the town of Wheatfield, accompanied me on the inspection of the creek and tributaries.

Geography

The accompanying map shows the territory involved and is approximately of the scale one inch equals one mile.

The State dam across Tonawanda creek is at the Main street bridge connecting the two cities, and backs up the water in the creek for several miles. Sawyers creek, in the eastern part of the town of Wheatfield is a tributary of Tonawanda creek. At Martinsville, or about a half mile from its mouth, it divides into two tributaries, each retaining the name " Sawyers Creek." The western fork lies wholly within the town of Wheatfield, is about three miles in length, and is the only portion of the stream concerned in this petition. The name " Sawyers Creek " when used in this paper will refer to this western fork. The eastern fork seems to be in good condition, discharges its water successfully, and is not the object of complaint.

Sawyers creek rises or rather begins to flow east about a half mile southeast of St. Johnsburg. The divide is imperceptible, and at this point, in the same depression, a branch of Bergholtz creek has its origin and flows to the west. This branch drains its territory satisfactorily. The trouble, then, lies entirely in Sawyers creek and its tributary ditches. The water in Sawyers creek at all times comes either as back-water from Tonawanda creek, or from surface drainage of snow or rain; it has no feeding springs. It varies in width from 25 to 100 feet, and rarely exceeds 2 feet in depth under normal conditions. The upper end of the creek (all west of the Nash road) has a smooth uniform bottom, having been cleared by the State some years ago of all

brush, trees, etc. East of the Nash road, however, and continuing as far as the junction with the eastern fork, the creek is scarcely more than a marsh during most of its course. The land is generally flat, the banks low, and the motion of the water very slight. In portions of the stream the growth of underbrush and trees is so dense as to act almost as a weir, and everywhere the growth of "cat-tails" and brush is luxuriant. The effect of this is felt whenever the water in the canal is materially raised, or after heavy rainfalls. The water in the canal, it is claimed, may raise from six to eight feet under the influence of a heavy southwest wind. Whenever from any of these causes the water in Sawyers creek is materially raised, it recedes slowly; leaving behind it a succession of pools, in which the water stagnates; and which become breeding places for mosquitoes, and menaces to the health of the community, according to the health officer. It is further claimed that great numbers of carp are carried up, or come up with such rises in the creek, becoming landlocked, and then dying and putrefying in such quantities as to produce a strong and offensive odor all along the line of the creek. The creek, throughout its length is followed by a road on the south side of it; and the houses are very numerous, there being about forty in the two mile stretch referred to; thirty on the south and ten on the north side of the creek. The people are all Germans, naturalized, and apparently thrifty. Their land is all cultivated practically, except those portions which are flooded by the overflow from the creek.

It is claimed that these back-water floods, and the consequent damages are not occasional, but occur every year once, and often more frequently.

At the time of my inspection the canal was low, and the greater part of Sawyers creek was frozen over. It was during a thaw, and open places in the creek revealed a slight flow of water toward the canal. It could readily be seen, however, that the condition of the creek would not permit of its draining itself when the supply of surface water was exhausted.

Tributaries

There are three open artificial drainage ditches, all in good condition, opening into the creek from the north. These are each

about a half mile in length. At present they are prevented from discharging their waters, however, because of the inability of the creek to carry off its own water.

What Is Needed for Relief

The existing conditions could most readily be relieved by clearing the bed of the creek of its growth of brush and weeds, and removing the deposits of logs and vegetable matter; all of which serve now to hinder the proper service of the creek. This work would be confined to the two miles of creek lying between Martinsville and the Nash road, and could, in the opinion of the local board and the supervisor, be done at a maximum cost of $3,000. This work would give relief from the existing conditions, and is essential to relief from floods.

Under these improved conditions the floods would still occur, but they would be only temporary in their effect, and the evil of a succession of stagnant pools would be removed.

If it were desired to keep out the floods entirely, it would be possible to check the back-water in Sawyers creek by a dam near the Erie railroad crossing, and then draining the territory now drained by Sawyers creek either (1) by deepening the channel of the branch of Bergholtz creek, or (2) by a ditch a little over two miles in length leading directly to the Niagara river at a point just north of the city of North Tonawanda. Either of these methods, however, would demand the clearing of the two miles of Sawyers creek; which in itself, as shown above, will give the necessary immunity from the effects of floods, if not from the floods themselves.

Topography, Flat

In the area bounded by the Niagara river, Tonawanda, Sawyers and Bergholtz creeks, there are no contours crossing on the twenty-foot interval map published by the United States Geological Survey. There are but three small mounds to break an otherwise level tract. This necessarily makes the problem of drainage rather difficult, but on the other hand makes the construction of ditches peculiarly cheap.

Climatological Conditions

The United States Weather Bureau at Albany furnishes the following data for Buffalo, N. Y.:

For 1905 — Total rainfall, 35.85 inches; maximum monthly rainfall, 4.54 inches in October; minimum monthly rainfall, 1.49 inches in March. Prevailing winds from southwest; 184 rainy days, 49 clear days, 163 partly cloudy days, 153 wholly cloudy.

The rainfall by months in a normal year, or the average annual rainfall by months is given in the following table,— in inches:

Jan.	2.98	April	2.49	July	3.18	Oct.	3.65
Feb.	2.84	May	3.43	Aug.	3.17	Nov.	3.54
March	2.56	June	3.51	Sept.	3.32	Dec.	3.37

Total precipitation for normal year........	38.04
Total precipitation for 1905..............	35.85

Geology

The State Geologist's office furnished the information given as to the geology of the region. It is a flat plain bounded on north and south by limestone belts. It is composed uniformly of a deep layer of soft Salina shale, over-laid mostly with hard-pan, clay and occasionally glacial drift. In this particular locality (Sawyers creek) it is over-laid with clay, but on approaching Bergholtz creek (at the edge of the Niagara limestone belt) it is over-laid with a refractory hard-pan. The overlying material in all places covers the Salina shale, and at depths varying from five to twenty-five feet.

Flood Discharges from Precipitation

The watershed of Sawyers creek as nearly as can be estimated from the geological survey map of the district is four and one-half square miles. Using this area in applying Kuichling's formulas for maximum flood discharges as given in the Barge Canal Report for 1901, we obtain:

(1) General formula for small drainage areas

$Q = \sqrt{458\,(640\,M + 4.58)} - 45.8$ (where M = area in miles, and Q = discharge in cubic feet per second for entire watershed.)

$Q = 1{,}100$ cubic feet per second.

(2) Formula for floods likely to occur $Q=M\left\{\frac{44000}{M+170}+20\right\}$

$Q=1,215$ cubic feet per second.

(3) Formula for floods which may occur rarely

$$Q=M\left\{\frac{127000}{M+370}+7.4\right\}$$

$Q=1,566$ cubic feet per second.

These formulas are given as applicable to streams which are comparable to the Mohawk river. As no data are given in the report for Tonawanda creek or streams near the district in question, data are obtained as above from these formulas, and must be modified to suit the features of Sawyers creek — especially (2) and (3).

Respectfully submitted,

ERIC T. KING,
Inspecting Engineer

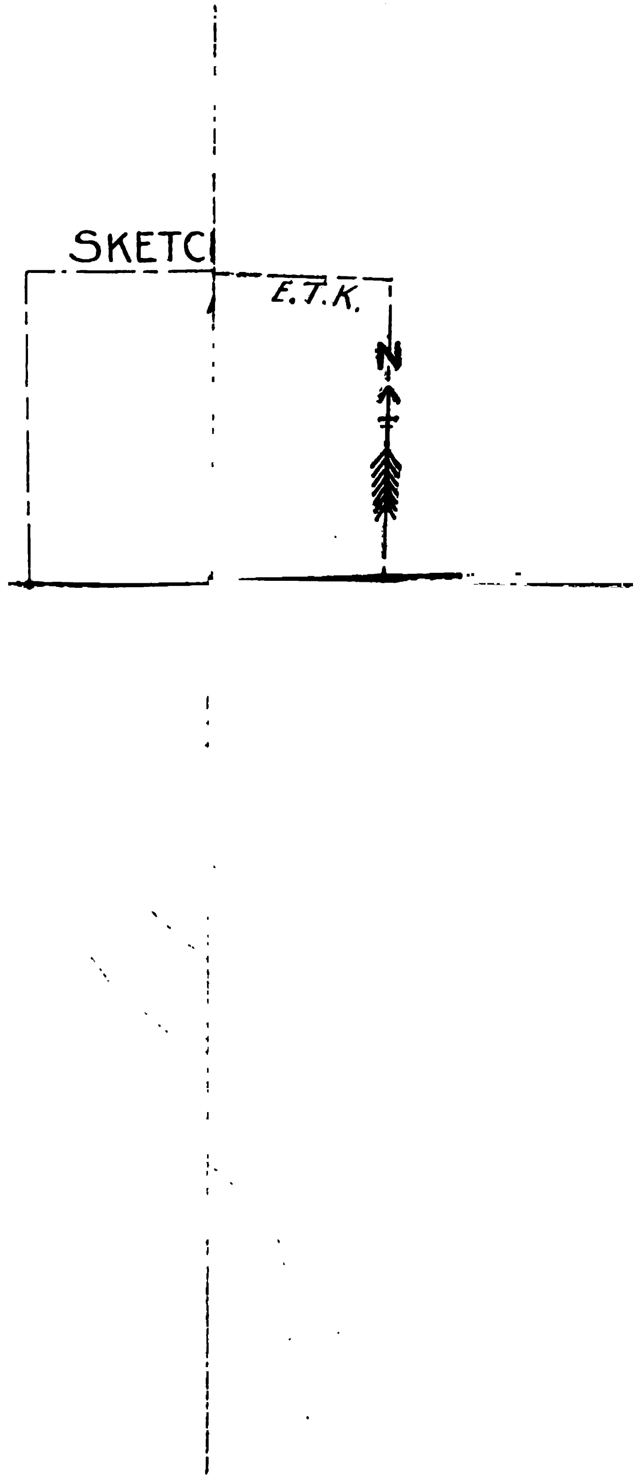
ALBANY, N. Y., *April* 6, 1906.

MR. WILLIAM H. SCHMIDT, *Supervisor, Town of Wheatfield, North Tonawanda, N. Y.:*

DEAR SIR:— Regarding the matter of the petition made to this Department concerning Sawyers creek in the town of Wheatfield, of which an inspection was made by one of our engineers, as shown by his report the existing conditions could most readily be relieved by clearing the bed of the creek, which would cost approximately $3,000.

This Department has no funds with which to undertake work of this kind.

As I have previously written you, the situation appears to be one where you would be warranted in making an application to the Legislature for an appropriation covering the necessary expense of making the necessary improvements. In case you desire to take such steps, I will be pleased to render you any assistance in my power and to lay before that body the report of our engineer showing the necessity for some action in order to remedy the existing conditions.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GARBAGE DISPOSAL

V. GARBAGE DISPOSAL

Town of Greenburgh, Westchester County

Barrett Garbage Dump

In response to complaint made by Mr. Edmund T. Ker of Elmsford, inspection was made of a garbage dump maintained by John Barrett near Elmsford. Following are reports and correspondence in the matter:

Schenectady, N. Y., *April* 27, 1906.

Eugene H. Porter, M.D., *Commissioner, New York State Department of Health:*

Dear Sir:— In accordance with instructions received from you by letter of April 25th, I visited on April 27th, the garbage dump on Taxter road, at Elmsford, N. Y. Dr. Wm. H. Todd met me at that point and accompanied me during the inspection. The question under consideration has been before you so long, that I beg to include other evidence than that which is purely ocular in this report.

The dump has been a continual source of complaint by Edmund T. Ker for several months past, and both the State Department and the local board have acted. Late in the autumn the local board in a body inspected the premises, declared that a nuisance existed, cited the president of Irvington village and the garbage contractor to appear and show cause why the nuisance should not be abated. The result of this action was the passing of an ordinance prohibiting the admixture of swill and garbage by residents of Irvington, and charging Mr. Barrett, the contractor, to keep the same separate and to feed the swill to hogs; also Mr. Barrett was instructed to refuse to remove all contents of cans wherein the ordinance was violated.

The ordinance further required Mr. Barrett to keep his dump covered with earth constantly. That these ordinances have been faithfully carried out is the assurance of Dr. Todd.

Inspection

"Barrett Dump" is situated close (entirely within 100 yards) to Taxter road, on the east side of the road, about a half mile from Elmsford — a station on the Putnam branch. It is about two miles from Irvington village, in a comparatively isolated spot, on high ground — a small plot — entirely surrounded by the estate of Helen M. Gould. From 800 to 1,000 feet north of the dump is Woodstock House,— home and property of Edmund T. Ker, the complainant in this case. He lives also on the east side of Taxter road, is slightly lower than the dump, but a knoll, higher than either intervenes. So much for the general location.

The dump is spread over perhaps half an acre, mostly covered with earth; there being one spot perhaps 400 to 500 square feet still uncovered. There are a number of pools of stagnant water, made by the filling. The garbage was apparently made up of ashes, papers, empty tin cans, rags, etc., but smelled strongly at the time. It is in a clearing in the natural timber, and is not so unsightly from the road as may be imagined. The odor however was noticeable on the road at time of inspection.

The swill is carted to the same point, placed in barrels on the edge of the dump and fed to hogs by pouring it upon the ground through a cattle fence separating the dump from the hog-yard. Two barrels each partly full were standing in this position beyond the reach of the hogs at the time of my inspection. These smell badly. The whole dump drains into a small stream which flows into the Hudson, fairly remote, and unused for any purpose. At the time of my inspection there was a strong wind from the north, and no smell was evident at any great distance from the north. I am unable to state what the effect of a mild south wind would have on Woodstock House, but I can vouch for a strong and disagreeable odor at the dump.

Mr. Barrett

Mr. Barrett claims that he has complied faithfully with the ordinance, refusing to empty cans improperly filled, reporting their owners to the police, and keeping his dump covered. He stated that he has closed a contract to continue removing garbage from May 1, 1906 to May 1, 1907.

Dr. Todd

Dr. Todd stated that he has made repeated visits to the dump, that the ordinance has been carried out faithfully, that in his opinion the ordinance is adequate and that the dump is now not a nuisance. He requested that I "tell Dr. Porter" that there is no site for a dump in the corporate limits of Irvington, that he as health officer (also of the town of Greenburgh) will not allow the dump to be located elsewhere in said town, that they can not dump it into the Hudson river, and that if dumping is stopped on the present site, the garbage must of necessity stand in the streets of the village.

Mrs. Ker

Mrs. Ker affirmed that the smell at times within the past month had been unendurable, that she had been rendered dizzy and ill at the stomach on one occasion in the past month.

The amount of garbage deposited daily is two large wagon loads.

Respectfully submitted,

ERIC. T. KING,
Inspecting Engineer

In response to further requests from Mr. Ker a second inspection was made.

AMSTERDAM, N. Y., *June* 26, 1906.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR:—At your suggestion I recently inspected the garbage dump near Elmsford in the town of Greenburgh, Westchester county, on the premises of John Barrett who collects the garbage from the village of Irvington.

For data as to location, surroundings, etc., of the garbage dump, I refer to Mr. King's report to you dated April 27, 1906.

I found the dump in a sanitary condition in so far as a garbage dump may be. The ordinance passed by the village board of Irvington requiring the covering of all garbage, when deposited, with earth, was being well carried out. No especially objectionable odor was apparent, though the near residents state that the odoı develops in the evening and drives them indoors.

The health officer of the town of Greenburgh, Dr. William H. Todd (who is also health officer of the village of Irvington), assured me that every precaution is being taken to maintain as favorable a sanitary condition at the dump as is possible and that the location is the most isolated and least liable to cause contamination of water supplies of all feasible locations for the dump.

If complaints of this dump continue to be received, I should suggest that the question be brought up of a garbage crematory for Tarrytown, Irvington and Dobb's Ferry.

Respectfully submitted,

H. B. CLEVELAND,
Inspecting Engineer

SCHENECTADY

ALBANY, N. Y., *October* 4, 1906.

Dr. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— In accordance with instructions received from you, I visited Schenectady, and investigated the complaint of Father Gogolegski of the dump in the rear of the Polish church and Polish school, located on Crane street, Schenectady.

I found the dump situated at a distance of about two hundred feet (200), from the buildings.

The day of inspection was still and cold, with no breeze blowing, but in spite of this an offensive odor could be easily detected at the church grounds.

The pastor claims that when there is a south wind, the windows of both the church and the school have to be kept closed.

There were several fires burning on the dump, and heaps of uncovered refuse, consisting of decayed fruits, vegetables, meats, etc., were to be seen at intervals.

There are three hundred and ten (310) children attending this school, and they are exposed daily to the unhealthful conditions arising from this nuisance.

Respectfully submitted,

J. F. GROGAN, JR.

ALBANY, N. Y., *October* 5, 1906.

Dr. WILLIAM T. CLUTE, *Health Officer, Schenectady, N. Y.:*

DEAR SIR:— Several complaints have been received at this Department with reference to a dump in the rear of the Polish church and Polish school, located on Crane street in your city, and one of our inspectors visited the premises.

He advised me that there were several fires burning on the dump and heaps of refuse, consisting of decaying fruits, etc., were to be seen. I should recommend that your board of health take steps to have an inspector placed at this dump to see that no decaying matter of any kind is deposited there unless it is covered at once, and I would also urge that they take proper action to have the dump covered with earth at suitable intervals and also to present the burning of the refuse matter on the dump, the smoke from which is very annoying.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health